



FRIDAY, AUGUST 6.

Southern Railway & Steamship Association.

We give below the annual report of Mr. Virgil Powers, General Commissioner, as submitted to this Association at its meeting held in Washington, July 14:

REPORT OF THE GENERAL COMMISSIONER.

GENTLEMEN: I herewith submit tables showing Comparative Statement of business done for nine months, from Sept. 1, 1884, to May 31, 1885, and from Sept. 1, 1885, to May 31, 1886.

The tables show an increase of 2.14 per cent. in tonnage and 2.59 per cent. in revenue on merchandise, and a decrease in cotton of 27,866 bales and \$149,735 in revenue, being a decrease of 4.3 per cent. in bales and 20.1 per cent. in revenue on cotton.

The largest part of this is due to a decrease of 31,024 bales cotton shipped from Augusta, a portion of which was shipped to local stations on South Carolina Railroad and has not been reported owing to a difference of construction of agreement concerning the local cotton of South Carolina Railroad between the authorities of that road and myself, to which reference is made hereafter in this report.

In addition to the above is 22,980 bales decrease in shipments from Newman and West Point, owing to movement via Opelika and Montgomery and Opelika and Columbus, not included in the division of business.

The decrease of divided revenue on cotton is fully accounted for in the foregoing items, and the additional fact that during 1884-85 cotton was divided on total revenue, including compress; but during 1885-86, compress was deducted before making division. In this connection see my further remarks in this report.

It is 10 years since I was elected General Commissioner, or executive officer, of your Association; during that time many changes have taken place and large improvements made in your organization.

Then (July 1876) there were several classifications. The Eastern Lines had two classifications; the Savannah Lines using nine classes, and the Charleston and Coast Lines working five or six classes. The Western Lines were working the Green Line classification of five classes, with a number of specials.

On Nov. 28, 1878, a Convention of the Eastern and Green Lines was held, and appointed a Rate Committee to take these questions into consideration. That Committee, composed of five members of Western and five of Eastern Lines, met in Nashville, on Dec. 12, 1878, and after a laborious session of six days, agreed on uniform rates and classification to be used from the East and West. This was a long stride in the right direction; since that time the Rate Committee has been continued, and from time to time made such changes in classification and rates as they believed to be necessary. Prior to this the Eastern Lines made rates from eastern cities, with a general understanding with the West as to rates, etc., on certain articles, and the Western Lines did the same from the west, which proved very unsatisfactory.

Since that time, the uniform classification and rates have worked very satisfactorily, with occasional drawbacks, which were to have been expected; still the rates and classification have given general satisfaction and worked out good results; and the classification and rates, as fixed by our Rate Committee, under its rules and regulations, should be strictly carried out by all.

Recently there has been formed an organization known as the Associated Roads of Kentucky, Tennessee and Alabama which has appointed a Commissioner and Rate Committee and authorized them to make rates and classification from western points. At least, their Committee have proceeded to make changes in rates from certain points and reduced the classification on a number of articles, in violation of their agreement made with, and as members of this Association. This is, in my opinion, taking a long step backward, as it has already resulted in heavy loss in the reduction of classification on a number of articles that were classed, as our Rate Committee believed, correctly. If this course is continued, it will result in the general reduction of rates and classification.

There should be, as our agreement makes it, but one committee to make rates and classification on all articles coming into territory south of the Memphis & Charleston Railroad, and east of the Mobile & Ohio Railroad, if not south of the Ohio & Potomac and east of the Mississippi.

These constant reductions of rates and classifications on through shipments, to meet the views of manufacturers and shippers in various localities, are resulting in heavy loss to the railroads, without benefiting the parties supposed to be interested; because the reduction from one locality is followed by similar reductions from all, and the competition of markets is made on a lower scale of rates, to the loss of transportation lines, and no benefit, as intended, to competing markets. It is also a fruitful cause of complaints of discrimination, as these through rates are frequently made so very low that it is destructive to the local revenue of the roads to make like reductions locally, thereby making the discrimination against local shippers very great.

To more certainly carry out the agreement to divide eastern business to certain competitive points, and to guarantee the payment of balances, the plan of making moneyed deposits to the credit of the General Commissioner was adopted August 1, 1877. Since then all balances have been promptly paid, and eastern rates better maintained than ever before; indeed, except for a few periods, when short rate wars were inaugurated, rates have been well maintained, and a large amount of revenue saved to all the roads and steamships interested.

The division of business at all competitive points on the basis of revenue and the prompt payment of balances, is the only plan yet devised by which rates and classification can be maintained for any length of time. If the business to and from certain points is divided, on the basis of fixed or agreed divisions and rates, and payment of balances secured, there is no reason for any line to reduce rates, as in doing so they lose the reduction themselves, as all business is divided on full agreed rates. I would, therefore, again urge the Western Lines to agree upon divisions of their business to all competitive points, as rates on their business have not been well maintained. Rate wars, as well as all sorts of deceptive practices, have prevailed, and the result has been very heavy loss in revenue to all.

I would respectfully call attention to the frauds practiced by shippers on transportation companies. A very large amount of freight is shipped on reduced or false classification, and the employees are either very careless or wink at these fraudulent practices.

When there is competition, if a shipper goes to a line with

a shipment, and the agent is well satisfied the shipment is under-classed, not being what it is represented to be, he allows it to go forward, and if it is found out and he is spoken to about it, he at once says, if I had been particular and set up the class, the shipper would have taken the shipment to my competitors and they would have taken it. This is the result of the want of confidence in each other by the employees of competitive lines. I will again repeat what I said last year on this subject.

"One of the principal reasons (if not the principal) for the present demoralization in the railroad management of the country, is that the officials have too little, I might say no, confidence in each other. This should not be the case. All of the principal managers in the various departments of all of the roads should so act as to be above suspicion of wrong doing, that implicit confidence may be accorded them in whatever they say or do. If this be done, and reasonable, just and fair divisions of business and agreements be made and lived up to by the managers, and all subordinates be required to carry them out strictly, no violation allowed on any pretext whatever, there will be some hope for the future of the railroads of the country; without it I see no prospect in the future for them. There certainly is but little hope in the future for them under the existing state of things."

The presidents and general managers are, or should be, held responsible to and by the owners of the property they manage, not only for its physical condition but for its revenues also; and they should carry out all their agreements faithfully and fully, and see that their subordinates do so. If a few of the principal subordinate officers were removed for allowing such practices in their subordinates, this trouble would very soon be corrected.

Another great loss to the transportation companies, principally the railroads, is the large amount of freight carried by the roads underbilled in weight. I venture the opinion that seven or eight-tenths of the carload freight carried by the railroads are billed at underweight, as well as considerable percentage of the package freight, where it is not weighed into the cars by the roads themselves.

To correct these irregularities I recommend that inspectors and weighers (one man filling both places) be appointed at each prominent point where freight is shipped or passes through, and that the railroads provide facilities for weighing, and that the weighers be required to weigh all freight and examine all doubtful packages, to see if properly classed, and that the weighers be transferred or exchanged from one point to another frequently.

I was directed to do this by the Rate Committee, but as it would increase our expense account materially, I referred the question to the Executive Committee by letter. The most of them ratified the action of the Rate Committee, but one or two thought it best that the Executive Committee discuss the matter and action be taken by them. I, therefore, did not carry out the direction of the Rate Committee, but I now urge you to authorize their appointment.

This plan has been adopted by the Southwestern Association out of Chicago. I herewith submit a statement sent me by Commissioner Midgley, showing the saving to the roads interested. The adoption of the system no doubt saves as much or more than is shown by the statements, in preventing parties from attempting these frauds. It is also of record that the system of weighing car lots has resulted in saving much larger amounts. * * *

I desire the Executive Committee to determine how much should be charged for compressing cotton, particularly at Augusta. Also, as to including cotton shipped from Augusta to local stations on the South Carolina, and the Charlotte, Columbia & Augusta roads, about 10 miles from Augusta. Also, whether it is not desirable to put boats on the Savannah River or subsidize those now there. The boats now on the river have and will carry some 20,000 bales of cotton from Augusta, which, at 75 cents per bale, is over twice as much per annum as was paid to subsidize them heretofore.

I herewith submit a statement showing gross revenue and balances to debit and credit, and the amount deposited to the credit of the General Commissioner and the amount paid out from Aug. 1, 1877, to May 31, 1886; also a statement showing amount of money received and paid out prior to Aug. 1, 1877; also a balance sheet, showing amount on hand and where deposited, on July 1, 1886. During this time the only loss has been \$1,018—lost by the failure of the Citizens' Bank of Atlanta. Thus I have acted not only as your Executive officer but as Treasurer also.

I also hand you herewith a list of companies constituting membership of the Association for the year just closing. Also a statement of expenses for the nine months, Sept. 1, 1885, to May 31, 1886, showing amount received for each company, and like statement for one year, from June 1, 1885, to May 31, 1886. The total expenses for the year were \$40,114.

CLAIM DEPARTMENT.

A very large amount of work has been done in this department. We note a decided improvement in the percentage of claims for loss and damage. Better cars, closer inspection and more perfect checking has decreased claims of this nature. Owing to frequent changes in rates, complications of rival interest and the division of territory by imaginary lines, etc., the overcharge claims have largely increased, and have become more difficult of adjustment in their final settlement, a large number have to be carried monthly into suspense account, delaying collections, which seems inseparable from the system inaugurated some two years ago. For the past 10 years we have been forming by direct resolution and the precedents of decisions, what is fast becoming known as our claim law.

The genius of our business seems to be consolidation and the establishment of universal law—i. e., law that is and that will be uniformly worked by all lines. Progress here, as in all modern undertakings, marks each month and year. New questions involving new principles are almost daily arising. Hence, the old law does not reach all, and sometimes is found inadequate to cover cases heretofore readily disposed of. Divergence as to construction, and the determination of strict equity in adjustments, is often encountered. The necessity for a revision of old law or rules and the creation of new law and rules grows more and more imperative. I invite your attention to this subject.

The different claim offices are daily legislating and deciding upon property, not only of their own, but that which belongs to their neighbors. Expert capacity in these departments becomes more apparent each day, demanding long training and judiciously inclined minds to enable them to make equitable and faithful decisions. In the past I have given you the result of reflection and experience as to the handling and prompt payment of claims. It is a branch of our business that comes directly and often to the annoyance of the public, who cannot be reasonably educated to the idea or necessity of delay in the payment of what they regard as just demands—causing as much or more complaint than any other source of our growing, complex and trying profession.

In this connection, perhaps, it is well to call your attention to the recent change in gauge, which practically makes all cars from all points to all points, through cars, under initial seals, increasing the necessity for uniform records and laws to determine liability, thereby expediting settlement and the final collection as between roads.

I recommend the appointment of a committee or commission, composed of the claim agents, to look into the question,

get up the rules governing in various localities, and devise laws and rules to govern the settlement of claims.

VIRGIL POWERS,
General Commissioner.

The Convention adopted a new agreement, to continue from Aug. 1, 1886, to July 31, 1887. The new contract is substantially the agreement of last year, with a few additions, one of which places the rate-making power solely in the Rate Committee of the Association, and another makes the dividing-line contract between the eastern and western lines a part of the agreement of the Association.

Decision of the New York Railroad Commission on the Car-Coupler Tests.

We have heretofore (page 471, number for July 9 last) published a brief summary of the report of the New York Railroad Commission on the car-coupler tests held at Albany in June. The full report of the Commission is now given:

The authorities of the New York Central & Hudson River Railroad Co. courteously put at the disposal of the Board every facility to make the trials as complete as practicable under the circumstances. The tests were made upon the curve of a side-track, and under such conditions as would most frequently occur in practical operation. Thirty-three different couplers were represented. The points and requirements particularly considered were as follows:

- First.—Facility to couple with its own kind with same or different height of drawbar.
- Second.—Facility to uncouple under all circumstances.
- Third.—Facility to couple with common link-and-pin, and whether automatic or not.
- Fourth.—Certainty to hold on uneven track.
- Fifth.—Capacity to set so as not to couple when kicked into side-tracks, etc.
- Sixth.—Non-liability of obstruction by dirt, snow, ice, rust, etc.
- Seventh.—Strength to resist concussion.
- Eighth.—Certainty of knowing which car to uncouple in the dark.
- Ninth.—Position of device to raise pin so as not to be above floor of car, with reference to applicability to platform cars.
- Tenth.—Non-interference of uncoupling device with brakeman guiding link into old drawbar.
- Eleventh.—Simplicity of construction.
- Twelfth.—Cost.

The importance of the subject is shown by the fact that the average number of deaths from coupling per year in this state for the last two years has been 16 deaths and 390 injuries to person.

The Board had three principal objects in making the tests: First.—To give an opportunity to inventors to display their devices in a public way.

Second.—To see what devices presented fulfilled the requirements of the law.

Third.—To take another step toward determining, if possible, which is the best coupler.

The first two objects were attained. Some, but not much advance was made toward the third. There are so many devices having merit, yet none without objection, that the Board would be greatly embarrassed were it required to positively recommend any one to the exclusion of all others. This may seem a somewhat disappointing conclusion, but it is the only one possible under the circumstances. If the merits of all could be combined in one, a perfect coupler would be the result, but it must be remembered that every little improvement is patented, and, until sufficient essential patents are the property of one party, a perfect device seems impossible. In the analogous case of the Westinghouse air-brake a vast number of patents have been purchased by the Westinghouse Co., in addition to the original invention of Westinghouse, and so with almost every other device which is in final successful operation.

The Board proposes to give this subject its continued attention. The impressions and views it now holds it gives with due caution, reserving the right to alter or amend them as circumstances and increased investigation and experience may warrant.

To attain the main object of an automatic coupler, i. e., to save the limbs and lives of trainmen, it is most desirable that but one device should be in universal use. If there is diversity it will increase rather than diminish the present dangers.

There appear to be but two ways for this to be brought about, one by the operation of the law of the "survival of the fittest," the other by the creation by Congress of a commission to determine upon one coupler and compel its adoption by all companies engaged in inter-state commerce.

The first method, it would seem, will be slow beyond all computation from present indications. There appears to be no good reason, however, why the second could not be done.

Under its powers to "regulate commerce among the several states" Congress has already prescribed rules for the inspection of hulls and boilers of steamships, for the examination of engineers as to their competency, for vessels being provided with boats, life-preservers, and for many similar things to insure the safety of travel by water.

It would seem that the same power could and should be exercised to insure safety in the operation of railroads.

From the diversity of the recommendations made by the states which have already acted on the coupler question, it seems to be hopeless to secure unanimity from them acting separately.

One is embarrassed at the outset of this subject with the fact that there are two rival and irreconcilable classes to deal with—first, the so-called "vertical plane couplers," and second, the link couplers.

VERTICAL PLANE COUPLERS.

Some of the practical difficulties with the vertical plane class are:

First.—None of them, as at present manufactured, with the exception of the Cowell and Janney, couple automatically with any other.

This difficulty could be remedied to a great extent by having the movable knuckle universally on the right side, and of the same size. But positive objections are made by the Hein company, for instance, to altering the proportions of the coupler, on the ground of destroying its strength.

Second.—None of them undertake to couple automatically with the old link-and-pin, except the Cowell.

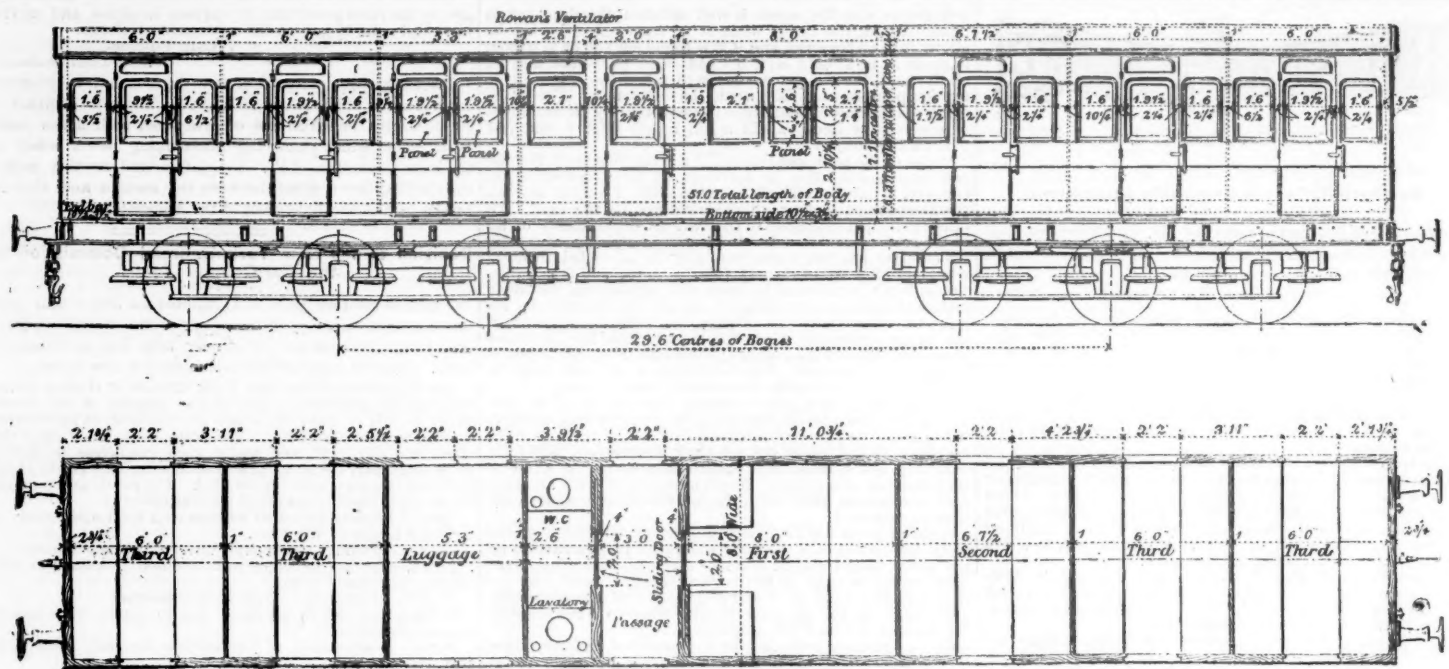
This is a most serious objection, for the reason that the slot into which the link goes is much smaller than in the old draw-head, and the danger to the brakeman of getting his hands caught correspondingly greater.

The cars with which many of them are equipped are not provided with deadwoods, so there is no protection for the trainmen in case of the draw-heads being broken by concussion. Deadwood blocks should be provided in all cases.

The device to couple and uncouple is frequently in the way and adds another danger.

In the case of the Cowell a throat is cut in the face to take a link. There is a dog moved by a spring to hold the pin up. This dog is intended to be pushed back by the link, and the pin to fall automatically. The difficulty is twofold.

First.—The link would only be pushed in by a draw-head



"BOGIE CARRIAGE," LANCASHIRE & YORKSHIRE RAILWAY (ENGLAND).

Exhibited at the Liverpool International Exhibition. Constructed at the Company's Works, Manchester.

having a solid throat. (This difficulty is common to a great many.)

Second.—The throat in the Cowell is so shallow that the link strikes before the draw-heads come in contact, so the link would take the whole force of the blow in coupling, and would bear the whole strain pushing—conditions which would bend or break it.

Third.—Almost all of the vertical chain couplers appear to be more or less liable to become fouled by dirt or rust if left standing for some time exposed to the weather, although there is quite a difference in them in this respect; the contrivance to catch the arm and hold it in place being quite complicated in some and simpler in others.

LINK COUPLERS.

Link couplers as a class present certain obvious advantages. They are simple in construction, cheap, not so liable to get out of order, conform better to the present method of coupling, and afford more slack, thus allowing a long freight train to be more easily started than if coupled with the closer vertical plane type. The Board does not propose to discuss the question as to which class forms mechanically the more perfect union. It is sufficient to say that either forms a sufficiently perfect union. The advantage which many of the link class possess of coupling automatically with the old drawhead the Board deems of great importance. It will be many years before the latter is entirely discarded from the railroads of the country, and, therefore, forms an important factor in the problem.

A serious difficulty, however, with this type is that none of them will couple automatically with the old drawhead unless the latter has a closed throat, so that the link will be pushed on to the hook or against the dog to allow the pin to drop, as the case may be.

All those familiar with the subject will recognize that this requires a link of a standard length, and a throat both in the old drawhead and in the automatic drawhead of a standard depth, shallow enough to insure the link being pushed so as to secure connection, and deep enough to permit the drawheads to come in contact after connection.

Inasmuch as a very large proportion of the old drawheads are either skeleton or hollow too far back, this requirement makes an automatic coupling with them impossible.

It is desirable that a standard link be adopted and that all drawheads be provided with a stop in the throat so as to permit the link to enter but $\frac{1}{2}$ in. beyond its middle point. This could be done at a trifling expense.

It is quite obvious, therefore, that any automatic coupler requiring a link longer than the standard (say $10\frac{1}{2}$ in. inside measurement) is essentially defective. This is equally true with regard to any fixed link coupler.

It is also asserted that any hooked coupler (such as Archer, etc.), is apt to have hook wear away, thus rendering uncoupling liable—this fact gives an advantage to a pin.

The law of the state, as it exists to-day, is very broad. It provides that no coupler shall be placed upon any new freight-car * * * unless the same can be coupled and uncoupled automatically without the necessity of having a person guide the link, lift the pin by hand, or go between the ends of the cars.

Such coupler might be defective, however, in many of the respects heretofore pointed out. The strict legal duty of the Board would be fulfilled in seeing that the railroad corporations adopt such devices as come within the law, however defective in other respects; and, indeed, it is the only positive power vested in the Board in the premises. It has deemed it better, however, to call attention to the matters hereinbefore mentioned, and to make the following recommendations:

CONCLUSIONS AND RECOMMENDATIONS.

The Board of Railroad Commissioners recommends:
First.—That the standard height of draw-bar of the Master Car-Builders' Association, viz.: 2 ft. 9 in. from top of rail to center of draw-head when car is empty, be adopted by all railroad corporations; that new cars be made to conform thereto, and that old cars when repaired be made to conform as nearly as possible.

Second.—That all freight-cars not having platforms be equipped with deadwood blocks to conform to the standard of the Master Car-Builders' Association.

Third.—That a standard link be adopted of $10\frac{1}{4}$ in. inside measurement and 13 in. outside measurement.

Fourth.—That all existing link-and-pin drawheads be provided with a stop in the throat to prevent a link entering more than 7 in.

Fifth.—Of the couplers presented to be tested on June 16 and 17, the Board finds the following to fulfill the requirements of the law:

There are many others of which the Board has drawings or models, and which possess merit; but as to them the Board makes no mention, for the reasons: first, that cars were not

equipped with them; and, second, that but little weight can be given to the working of a model alone.

Those practically tested are divided:
First.—Into classes mentioned in what the Board regards as the order of merit.

Second.—Each coupler is mentioned under its class in what the Board regards as its order of merit.

FIRST CLASS.

A.—Link and pin couplers; pin held up by catch or dog. The dog is thrown back by link entering, allowing pin to drop automatically—uses standard link and couples automatically with old draw-bar if stop in throat, or,

B.—Beveled pin permitting link to slip under:
Hoag; McKee; N. Barr; Perry; United States; Robinson; Keeler; Sherman; Thurber; Whitman-Kilmer (beveled pin); Wilson (beveled pin).

SECOND CLASS.

Vertical hook and link. Link pushed on to hook. Couples automatically with old drawbar if stop in throat: Archer; Aikman; Marks; Smillie; Baldwin; Fennell.

THIRD CLASS.

So-called "vertical plane couplers." A knuckle opening in a horizontal plane, fits into a corresponding knuckle on other drawbar—does not couple automatically with old drawhead, except Cowell, which has throat in face:
Janney; Barnes; Cowell; Thurmond; Dowling; Hien; Titus & Bossinger; Boston Automatic; Lorraine.

FOURTH CLASS.

Fixed link. Does not couple automatically with old drawbar:
Ames; Curtis & Wood; Adams; Felthausen & Lawten-slager.

MISCELLANEOUS.

Powell: Has a toothed wheel to serve for pin. Ingenious, but practicability has not been demonstrated. Couples automatically with old drawbar.

Wood & Drake, doubtful utility. Kaltenbeck, doubtful utility.

"Bogie Carriage," Lancashire & Yorkshire Railway.

The accompanying engravings, for which we are indebted to our contemporary, the *Engineer*, show very clearly the construction and proportions of a type of passenger car much used on the fast express trains of most English railroads. It will be seen that the car is about the same length as a first class coach used here, and conveys about the same total number of passengers, 55 in all. The passengers are, however, of three different classes, and a space is devoted to baggage. This makes the one car a train in itself, and it can, therefore, be run as a through car and detached at any way station without necessitating any transfer of baggage or change of passengers.

It will be noticed that the car is provided in the centre with a water closet and lavatory. These can, however, only be used by the first-class passengers, and are not accessible to the second and third class passengers. As, however, these conveniences are provided at the stations, and are kept clean by special attendants, the want of this accommodation is not so much felt as might be supposed. In fact, many English travelers object to sit for several hours in close proximity to anything that may possibly exhale evil odors; and therefore in this case a passage is provided between the first-class compartment and the saloon.

The body of the carriage is, as usual, not built solid with the sills, but can be easily detached by removing a few holding-down bolts. Rubber blocks about 1 in. thick are interposed between the body and sills, and aid in deadening jar when running at a high speed. When the carriage has to be repaired, the body can be easily detached and sent into one shop for repair, chiefly to the upholstery, while the sills can be sent into another shop and the brake and iron work overhauled.

A great deal of pains seems to have been taken to make the car ride smoothly. Not only are six-wheeled trucks used for a car of moderate length where four-wheeled trucks would have sufficed, but independent semi-elliptic springs are placed

above each axle-box. The hangers, moreover, of these springs rest on rubber washers, so that but little jar and concussion can be transmitted to the bolster springs. Rubber is again used between the centre plate and side bearings, and the sills.

The car sills are deeper and heavier than usual here, the outer sills being $9\frac{1}{2}$ in. by $4\frac{1}{2}$ in., and the middle sills 11 in. by 5 in. The outer sills are moreover stiffened with heavy angle-iron 10 in. by 4 in. by $\frac{1}{2}$ in. Steps are attached to the sides of the truck, so that passengers may alight easily should the train come to a stand away from the regular high platform.

The sides of the car below the windows are painted a rich lake, while the upper part is brown, relieved by gold and black lines. The second and third class compartments are comfortably upholstered and provided with parcel racks etc. The first-class compartment is finished in light polished oak and upholstered with blue cloth. Mirrors are provided, and portable luncheon or card tables, which can be detached and folded away when not wanted.

Each compartment is lighted with gas distilled from oil by Pope's system. Special ventilators are provided over the doors, but there is no clerestory, which is not much liked in England, the leakage, fall of cinders, and extra resistance to high side winds being serious objections, which, after considerable trial, have been found to outweigh the advantages of the clerestory roof.

The car is fitted with the automatic vacuum brake, and in connection with this each compartment is provided with means of signaling the conductor. A small glass can be broken by a suspended knocker, and air admitted to the main pipe, destroying the vacuum and applying the brake.

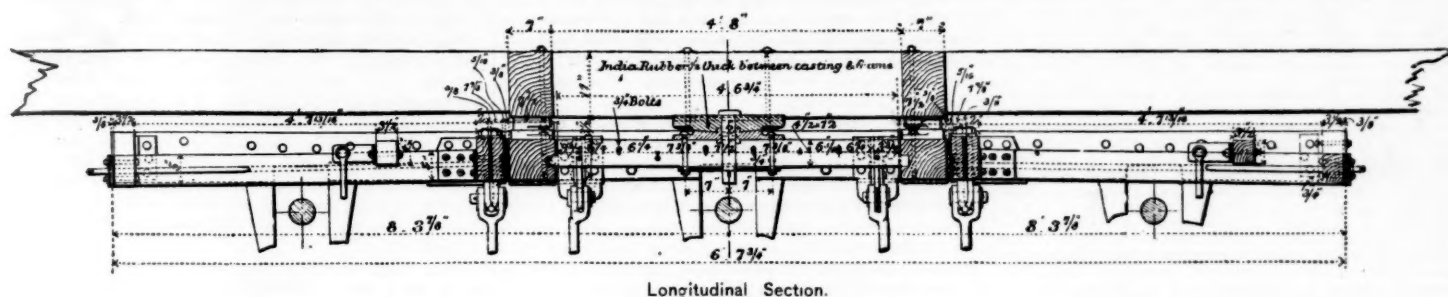
The carriage is exhibited at the Liverpool International Exhibition, now open, and was designed by Mr. Fred. Attock, Carriage and Wagon Superintendent of the Lancashire & Yorkshire Railway, at whose works the car was built.

The Standard Height of Drawbars for Freight Cars

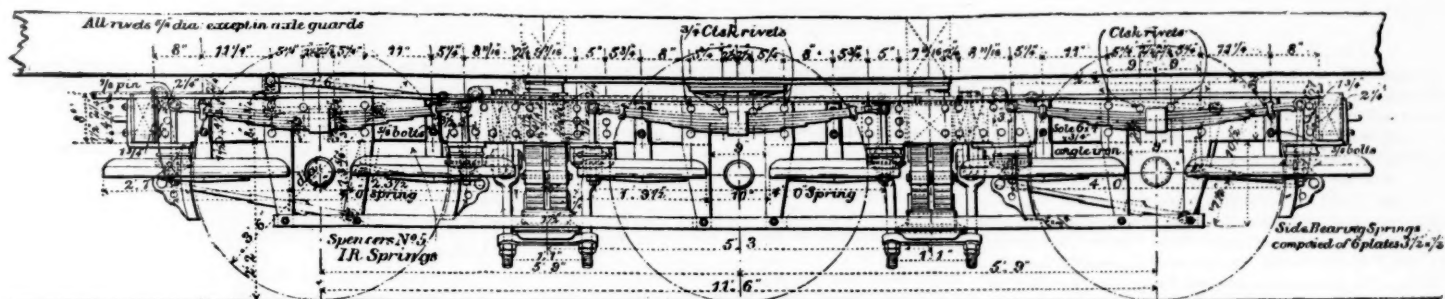
It has been known for a long time that one of the most prolific causes of accidents in coupling cars is due to the varying height of their drawbars. For that, and for other reasons, the Master Car-Builders' Association soon after it was organized took the matter up and attempted to establish a standard height for this important organ, it may be called, of freight cars. In 1872, after a somewhat acrimonious discussion, the Association recommended 2 ft. 9 in. as the standard height, but, unfortunately, the resolution which was then adopted did not specify whether this height was to be measured when the car was loaded or empty, and, consequently, for years thereafter, some of the members built their cars with drawbars of that height above the tops of the rails, when the cars were new and empty whereas others made allowance for the effect of the lading, and aimed to have the drawbars 2 ft. 9 in. above the rails when loaded. Still other companies established standards of their own and paid no attention to the action of the Master Car-Builders' Association. It seems probable, too, that there were among the members of that organization a considerable number who were ignorant of its action, or who never took the trouble to make their practice conform to what the association recommended.

At the annual convention of the Master Car-Builders' Association, held last year, a committee was appointed "to submit detailed drawings of dead-blocks to be adopted as standards by the association." This report shows that there is still a good deal of difference in the height of drawbars of the principal railroads of the country, and a still greater variation in the height of dead-blocks. The Committee therefore presented to the Master Car-Builders' Association the following question: "With the prevailing practice described, what is the best method to adopt to secure uniformity? Is it to adhere to the standard which was adopted 14 years ago, or would the end aimed at be best secured by a modification of it to suit the existing practice of the principal lines?"

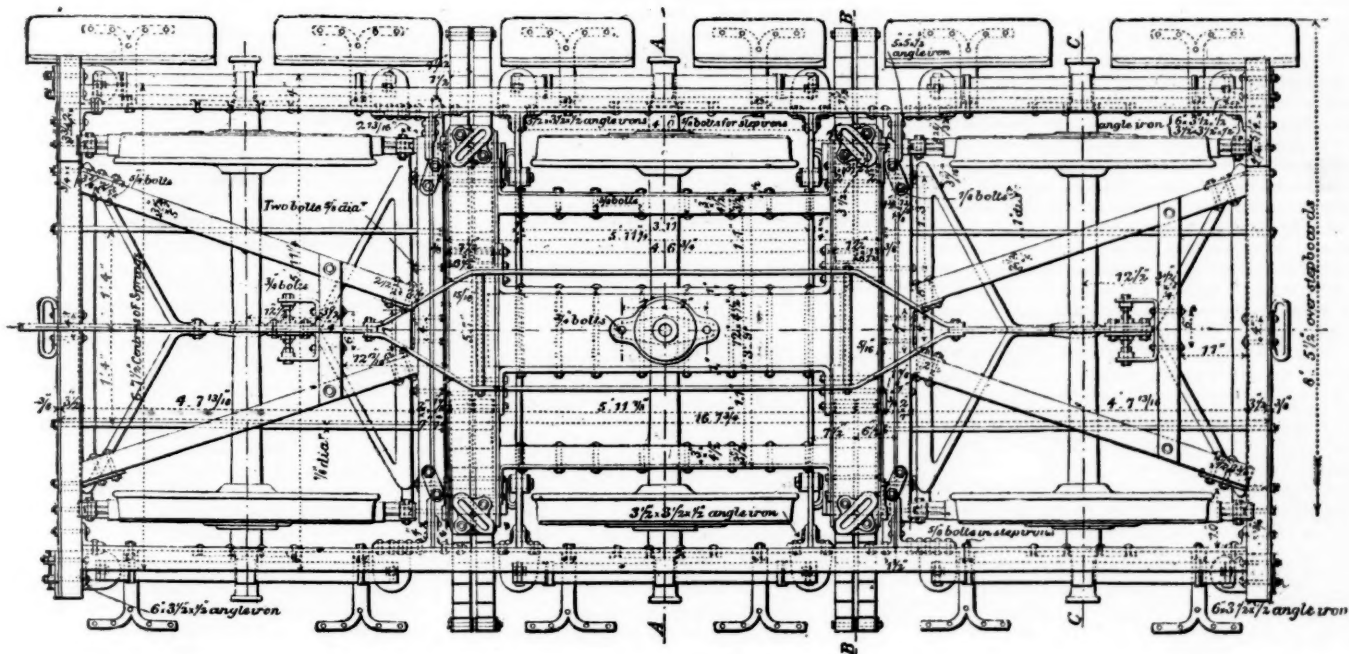
The Railroad Commissioners of New York have recently been testing various automatic car couplers. In their report they recommend the general adoption of the M. C. B.'s standard height of drawbars and dead-blocks. By referring to the table which forms part of the report of the Committee on Dead-blocks, it will be seen that the standard height of drawbars of the New York Central, the New York, Lake



Longitudinal Section.

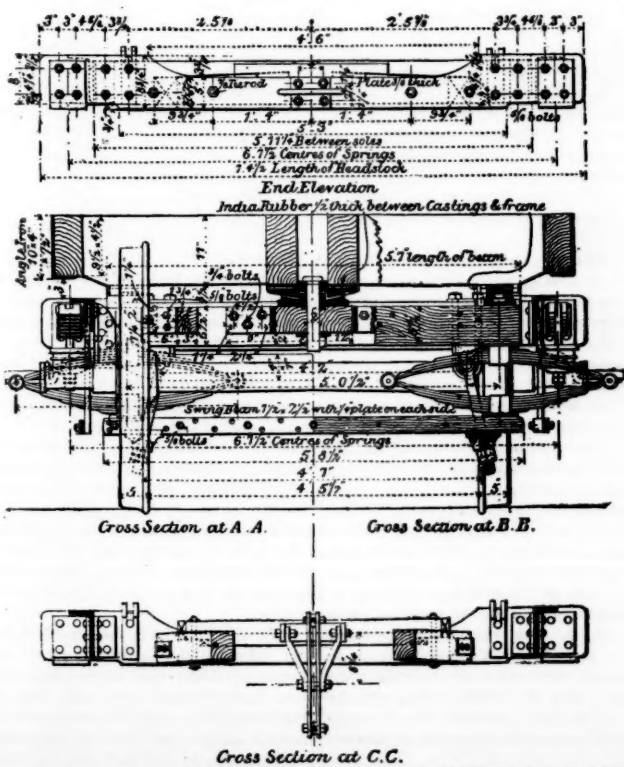


Elevation.



Plan.

TRUCK FOR BOGIE CARRIAGE, LANCASHIRE & YORKSHIRE RAILWAY.



Cross Section at C.C.

TRUCK FOR BOGIE CARRIAGE, LANCASHIRE & YORKSHIRE RAILWAY.

Erie & Western, the Pennsylvania, and the Baltimore & Ohio railroads is greater than the standard of the Master Car-Builders' Association. The same thing is true, but to a greater degree, of the height of dead-blocks. All of the four roads named have a considerable mileage in the state of Ohio. Now, supposing that the Ohio Railroad Commissioners should take the matter up, what height of drawbar are they likely to recommend? Would they probably ask the four principal lines in the state to abandon their practice and conform to that of lines which own a much smaller number of cars, and which have little or no mileage in Ohio? The next step to a recommendation of the commissioners is legislation compelling railroad companies to conform to what has been recommended. If the idea once gets fairly into the minds of legislators and the public, that variation in the height of drawbars and dead-blocks increases materially the danger of coupling cars, and interferes more or less with the interchange of traffic, it will probably not be long before there will be some compulsory legislation thereon, similar to the laws referring to automatic couplers, which so many of the state legislatures have adopted. When this time comes, it will be of the utmost importance that there should be agreement among the principal railroads of the country regarding the standard height for both drawbars and dead-blocks. It is to be regretted that all the railroad companies did not adopt the standards recommended years ago by the Master Car-Builders' Association, but the fact remains that they did not, and that the cars which conform to those standards are a minority. It is very much easier to raise cars up than it is to lower them. All that is required to increase the height of drawbars is to block up the center-plates and side bearings.

For these reasons the Committee recommended an increase in the standard height of drawbars and lead-blocks. This excited a very animated discussion at the convention, which resulted in a refusal to adopt the first two recommendations of the committee. This action indicated that the members who carried it through were either indifferent to the matter of uniformity, or else that they thought it would be more certain to be brought about by adhering to the action taken in 1872. With the great trunk lines united in favor of the Committee's recommendations, they will be almost sure to be carried ultimately. If, in fact, when the question was decided, the representative members had voted in proportion to the number of cars owned, as they have the right to under the constitution, the result would probably have been different from what it was.

It should also be noticed that, at the same meeting, a com-

mittee which was appointed to report on a standard height for drawbars for passenger-cars, recommended that it be 34½ in. This was referred to a letter ballot for decision. If adopted, there will then be three distinct standards for the height of drawbars, 33 in. adopted by the Car-Builders in 1872; 35, the standard of the Pennsylvania system, the Baltimore & Ohio and other main lines of road; and 34½, the standard for passenger cars. If the recommendations of the Committee, that the standard height be not more than 35 in. when the car is empty, nor less than 33 in. when it is loaded, had been adopted, it would have been accepted by the Committee on the Height of Drawbars for Passenger Cars, and there then would have been one standard for all cars. As it is, the whole matter is in a confused condition, so that it is quite certain to force itself on the attention of the Car-Builders' Association again in the future, and ultimately it will be decided upon broader principles than those which seemed to animate some of the members who helped to defeat the recommendations of the Committee, which, if adopted, would have established a standard to which all the railroads of the country could have made all their cars conform.—*American Railroad Journal*.

The Burlington Brake Tests.

Our report this week brings the Burlington brake tests nearly to a conclusion. The utility and value of the tests, however, will not fully appear until there has been more time to collect and collate the records, so as to accurately indicate just where, when and why each brake showed good and bad points. In reporting the tests we are divided between the desire to enable our readers to do this by presenting comparative tables of the very imperfect records which as yet are the only ones available, and our unwillingness to aid in disseminating imperfect, and, possibly, in some instances, very misleading, alleged facts. We conclude it will be better for the present simply to describe the tests as they occur, without attempting any definite comparisons. It should be borne in mind in comparing the following figures that they are all, especially the speeds, justly liable to suspicion, not being a part of the corrected records of the tests. Next week we shall probably be able to begin the publication of definite comparative tables.

On Monday, July 26, a single run of the American 50-car train was made "emergency stop," with the rear 20 cars cut out, the first of a series of such runs which it is contemplated to make, one for each competitor. Actually, there were only 48 cars in the train. It was hoped that this would considerably decrease the violence of the shocks, and perhaps it did, for there was no impact gauge when the first and last American emergency 50-car stop was made, when the shocks were terrific; no one of them so bad, perhaps, as the single one which comes with a Westinghouse emergency stop, but more of them. With the rear cars cut out the number of shocks was less as well as their violence, but the latter was considerable, as appears from the following record of stop 1:

Impact gauge	mov. d.	2 ft. 9¼ in.	Nothing
Bump	2 ft. 9¼ in.		
Slight lurch	Nothing		
Bump	3 ft. 1¼ in.		

and broke the rear drawbar next the way car. Chairman Rhodes was slid along the floor resting on his wrist, and the others present were scattered around a good deal. In this connection it may appropriately be noted that the free link slack in the American train is less than in any other, being only about 1 in. In this run likewise the leverage had been increased by throwing the brake-beam 2 in. further down on the brake-lever in hopes of ameliorating the breakage of brake-beams, which it did. The rear drawbar was so badly broken, however, that it was not safe to make another stop, and stop 2 was omitted. The record of the run was:

Stop No.	Speed.	Distance.	Time.	Impact gauge.
1	21	479	33¼	33¼ (lurch 0.7-16)
2	21½	558	27¼	33¼
3	38½	1880	24¾	30½

The train was made up of 48 cars, rear 20 cut out, and as another car was set out at West Burlington on account of the broken drawbar, the train continued with but 47 cars down the grade.

The middle cars of the train rode well.

The Eames Company was then called on to begin the "Service run down hill" test with 50 mixed cars, with speed worked up to 20 miles before reaching the starting point, then reduced to 15 miles and held there as nearly as possible down the grade.

The first test was made with 48 cars. The performance was again not particularly good, owing to lack of practice apparently, and was improved on at the final trial. The whole run was only 2 miles long. It is not the strong point of any power brake, but no serious difficulty was developed. The second trial with 49 cars was better, the time being six minutes from start to finish. As a whole, the Eames Company made a very fine record, and rather excelled the subsequent performance of the Westinghouse.

The Westinghouse Company was assigned three tests upon the same terms as the Eames Company for the afternoon. The first test, began at 2:10 p. m., was not completed, as the train broke in two between the tender and the dynamometer car, when about 400 ft. east of stop No. 3. The three runs were completed the same afternoon and showed a continual improvement, but hardly as good a record as the Eames.

Tuesday, July 27, was devoted to tests of the American train, 50 empty cars, rear 20 cut out, two trips of which were made, the first service stops and the second emergency, and to the three trips of the Eames loaded 50-car trains. The American Brake made its best record with 50-car trains in the first run, stops 1 and 2 having been exceedingly good as respects impact at the rear, and stops 3 and 4 not bad, as will be seen from the record below. The emergency run was likewise not particularly severe, the worst stop having given a 37½ in. impact, which was much the same as the Westinghouse made with the same train on the following Friday, and the stops likewise are quite as good as the Westinghouse if not a shade better. This record on its face might

lead to great hopes of the utility of the American were it not that other tests, especially a fearfully bad performance on the following day, indicate that these are the most favorable conditions for its making a good showing, and that under other circumstances it is quite otherwise. No damage was reported in these two trips.

The Eames 50-car loaded trips were attended by more breakage, as was natural, both from the badness of the cars, which are rather the weakest of those of any company here and from the heavy loads handled. On the first trip there was the break in two and broken centre-pin noted below. On the second trip after No. 3 stop the train broke in two at second coupling from rear, from a broken drawbar. It was some time before the front end was stopped, no doubt owing to brakes being off at front end because the engineer was working his large ejector to get up vacuum, and maintained it on front part of train in spite of the train pipe being open at the rear. This there is reason to believe is one of the difficulties inherent in the vacuum type. As it is to be made the subject of special investigation, however, we postpone any further comment or explanation.

At the No. 4 stop the train again broke in two during the stop, another drawbar yoke having broken at the tenth coupling from the rear. The train parted about 10 ft., then closed, and then separated about 15 ft., the brakes acting well, but the automatic feature being dormant from the fact that brakes were already applying. The break-away quickened the application on the rear, however, and thus prevented shock.

Going back there was a third break in two from a broken pin at the fourth car ahead of the middle of the train.

After the following No. 4 stop a car near the middle of the train broke a truck spring-hanger and was set out, which completed the breakage list as discovered during the run. The complete repair lists, when made up, will show more damages for this and the record.

The following was the record for the day:

TUESDAY, JULY 27.				
AMERICAN, 48 EMPTY CARS—SERVICE STOPS.				
Rear 20 cars cut out.				
TEST NO. 1.				
Stops.....	1	2	3	4
Speed.....	22	35½	24	37½
Distance.....	734	1,569	1,040	2,389
Time.....	33	48¼	40¼	64¾
Impact-gauge.....	11-13½	16½ 8¾	0 13-16	9-16
		0.5-16, 0.3-16	0.3-16	
TEST NO. 2—EMERGENCY STOPS.				
Truck of one car near rear cut out.				
Stops.....	1	2	3	4
Speed.....	22½	30½	24	40½
Distance.....	511	865	657	2,024
Time.....	23¾	31½	29	56¾
Impact-gauge.....	17 1-16	9 11-16	28¾	37½
		209%	18%	0 1-64
EAMES' VACUUM BRAKE.				
48 loaded, 1 empty car—Service Stops.				
TEST NO. 1.				
Stops.....	1	2	3	4
Speed.....	21	32	24½	34½
Distance.....	946	1,723	1,544	2,706
Time.....	41¾	54¾	62	83¾
Impact-gauge.....	13½	0.3-16 (0%)	0.1-16 (2%)	13 1-16
	12 13-16	4%	0.1-32, 0.7-16	1

After fourth stop broke in two at eighth car from end. Hand-brake used on rear to prevent running into front section. Drawbar yoke broke, and one centre pin near middle of train.

TEST NO. 2.				
49 cars, 48 loaded; for stop No. 4 only 48 cars.				
Stop.....	1	2	3	4
Speed.....	19½	30	22½	31
Distance.....	713	1,425	1,036	1,908
Time.....	35	47¾	43	64
Impact gauge.....	0%	(0%) 5%	(0%) 2.3-16	train parted.

TEST NO. 3.				
47 cars, 46 loaded.				
Stop.....	1	2	3	4
Speed.....	19	30½	21½	35
Distance.....	740	1,423	1,009	2,688
Time.....	34½	49¾	44¼	84
Impact gauge.....	0 1-64	0¼, 0 1-16	(0.5-16) 2 1-16	13%

On Wednesday, July 28, the "break in two" tests began, although a large assortment of unintentional break-aways had already occurred, which had well shown the importance of this feature, and seemed to make any official tests somewhat superfluous. They can hardly be called so, however, as they developed important features which are to be looked into further.

The tests were made on 25 car mixed trains, 75 per cent. (9 out of 13) of the loaded cars being in the rear section. The pin was pulled between the 12th and 13th cars from the rear. In all the test trains, the dynamometer car at the head of the train and the way car at the rear are in addition to the specified number of cars, the autographic brake-rod tension and velocity apparatus between placed in the middle one of the braked cars undergoing test, being transferred from train to train. This car is necessarily always empty, even in the loaded car tests, and the brakes on one truck are always inoperative, since the brake-rod tension is expended instead on the spring of the recording apparatus.

Only the Westinghouse and the Eames companies participated in this test, the buffer brakes, which can only rely on the brakemen in such cases, not caring to enter it. The tests were made by a 20-mile break at stop No. 1, then backing up and making a 40-mile break at the same stop; then backing up and making a second 20-mile break at stop No. 1 and a 40-mile break at stop No. 2. This was done to save time. The engineer shut off to take the slack out of his train, so that the pin could be pulled, then pulled out to imitate the conditions of practice as nearly as possible; then, when he felt the brakes going on his train, shut off. The Westinghouse tests came first, and they were very good, as appears below.

At the second stop No. 1 the train separated some 20 ft.,

then closed, and then separated 5 ft. No casualties were reported, and the impacts were all under 1½ in.

The American 50 car mixed loaded and empty "service" drop down hill, all cars braked, then intervened and was certainly a tremendous performance. We gave a short summary received by wire last week. The train got away with 48 cars, and, before reaching the starting point, broke in two at two points with impacts of 13½ in., lurch of 1½ and bump of 28½, which are pretty severe. This was the effect of a slight variation in the speed of the engine. At the ninth coupling from the rear there was a broken link, and further ahead a broken pin. The link was twisted as if by a boiler explosion.

Going back for a new start there was a second violent shock, which broke a Safford draw-bar on the car immediately back of the dynamometer car (which was for the time being at the rear of the train), and thus permitted it to telescope over the platform of the latter, smashing it in considerably. Engineer of tests Wallis was at that time recreating himself by sitting on the platform railing, and was considerably surprised by receiving a sharp blow in the rear from the side of the box-car as a suggestion to go inside, which he did. As one of the trainmen put it, "he will be no whiter when he is buried," and with no little reason. Another man was standing holding on to the brake-wheel when it broke in his hands. Chairman Rhodes was on top of the train and nearly fell between the cars. No serious harm was done, however, and with 46 cars, the rest being out for repairs, the service run began.

It was an experience which those who shared it in the rear car (among whom were none of the four or five representatives of the brake on the train) are not likely to forget nor to repeat. On the engine the motion was good. Orders to be exceedingly cautious were given the engineer, after the disastrous experiences detailed; he was not required to attain 20 miles per hour for starting, and beyond putting on his brakes slightly at the top of the hill, which he found reduced speed very fast, so that he threw them off very quickly, he did nothing whatever to put on or keep on brakes, but was simply a passenger.

In the middle car the motion was not bad to the senses, but the diagram of the brake-rod tension, which we shall publish next week if possible, shows that the brakes went on and off in wave-like fashion some 28 times.

In this car were four representatives of the brake company, who thought until the run was ended that it was doing very nicely.

The "music" was in the rear car, as previous tests had clearly indicated was likely to be the case. The speed throughout the train was very irregular during the run and it occurred from the undulatory applications of the brakes, without any brakes set at the head of the train, which produced the following "bumps," as measured on the impact gauge by Chairman Rhodes, with a pluck, coolness, presence of mind and devotion to duty which has been conspicuous throughout the tests, and needed in a large part of them, but nowhere more so than in this run. The weight traveled the entire distance of the trough several times, as did also the legless chair made thuswise:

in which Chairman Rhodes sat and slid along the floor, and the seat cushion on which "Uncle Ben" Welsh of the committee reclined as assistant slidometerian. The present writer might have assisted Chairman Rhodes in keeping the records had his head been sufficiently level, but he found it difficult to keep his head level during the ensuing run of 10 minutes and about a mile and a half, since it was thrown over 28 times to the horizontal during the run by the following bumps:

In.	In.
Bump 17¼	1¼
" 9¼ (and touched side.)	23¾
" 11 3-16	3
" 10%	34
" 11%	3
" 3	22½
" 13¼	14½
" 15%	0%
" 18¼	18 7-16
" 6¼	0%
" 13%	63
" 21%	2
" 20	
" 16%	
" 11%	
Total.....	395¾

when the train broke in two at two points, evidently from the effect of the 63 in. bump, a link being broken at the eleventh coupling from the rear and another one further ahead. When the train had been stopped by the hand brakes as it was without collision, it was found that the carefully piled loading of car wheels, which had been stowed with more than usual care with a heavy stick across the end to guard against this very contingency had knocked out the end of nine of the rear cars so that the wheels were projecting from some of them, and with one or two more lurches like the last would have fallen on the track. As the cars were entirely new and unusually strong, being really 60,000 lb. cars, the violence of the shocks can be appreciated. They averaged 14½ in. each, coming about 20 seconds apart in time and 275 ft. in distance. An 8 to 10 in. bump is the limit which has been fixed on as one of the endurable kind for regular service.

After this experience the American Company declared that they did not wish to make any more regular 50-car tests, although the chance was offered them, and they are to make some unofficial trials after the tests are over. They claim that with 20 rear cars cut out there would have been nothing like this happen, and it would unquestionably have ameliorated the shock; but had the cut out cars been scattered through the train this is far more doubtful.

In the afternoon the Eames "breaks in two" were taken up. Their first break in two led to a bump of 16 1/4 in., and the two sections came together with some force. The Eames Company claim that this was because the engineer did not use his large ejector so as to take off some of the brakes in front, even if the brake pipe was open in the rear. This whole question is one which we can consider to more advantage later, when all the facts are in, and therefore, for the present, we pass it. The runs of the Eames train were much longer than the Westinghouse after breaking in two, as will appear below.

On the return the usual casualty with the Eames train happened, a break in two from a pin jumping out, which held the brakes on for some time. A couple of drawheads were also broken, making it necessary to set out two cars.

On the second (40 miles per hour) stop the sections separated 423 ft., the working of the large ejector throwing off so many brakes on the front section that the retarding force was small. It was plainly determined to have no coming together of the sections this time.

The results of the break-away tests were as follows:

The Westinghouse, 25 mixed cars, running at 20 and 40 miles on the level, train to be broken in two in the middle and distance run by first part of train to a stop as well as distance between sections of train to be noted at the complete stop of both sections:

TEST NO. 1.				
Stop No.	Speed.	Distance.	Time.	Train sections difference.
1.....	24	275	12	55 feet
2.....	41	660	21 1/4	5 "

At stop No. 2 of test No. 2 the two sections of train came together with light shock, afterward parted and came to full stop with the two sections five feet apart.

The Eames brake was then tried under similar conditions, and tests gave the following results:

TEST NO. 1.				
Stop No.	Speed.	Distance.	Time.	Train sections difference.
1.....	22 1/4	374	15	Came together
2.....	36	1,914	5 1/4	423

Same except 12 loaded cars, 11 empty.

TEST NO. 2.				
Stop No.	Speed.	Distance.	Time.	Train sections difference.
1.....	25 1/4	748	30	150
2.....	36 1/2	1,342	37 1/4	25

The tests of Thursday, July 29, were ushered in by an Eames 25-car mixed train, arranged as usual, rear 20 brakes cut out, in continuation of the special test series. The first run was service stops and the second emergency stops.

The results were:

TEST NO. 1.				
Service:	Speed.	Distance.	Time.	
Stop No. 1.....	21 1/4	681	31 1/4	
" 2.....	38	1,874	59	
" 3.....	21	964	46	
" 4.....	41	3,684	102	

The slidometer record of bumps was very good, as follows:

TEST NO. 1.				
Stop No. 1.....		10.5-16 in.	2 1/4 in.	
" 2.....		3-16 in.		
Nos. 3 and 4.—No bump.				

The ameliorating effects on the shocks of cutting out the rear cars is evident, but the stops as a whole were not a particularly brilliant performance. Until the correct speed records are made up and the other details have been signed, we forbear entering into the discussion of comparative efficiency and the noticeable variations in the stops which the statistics invite.

Following the Eames tests came one of the Widdfield & Button, with 50 empty cars, the brakes on the rear 20 cars cut out; service stops. The record was:

Stop	Sp.-ed.	Distance.	Time.	Impact gauge.
1.....	24	877	40	32 13-16, 32, 4 1/4
" 2.....	37 1/4	2,231	71	14 1/4, 7 1/4 (lurch 1-64)
" 3.....	21	731	42	3 1/2, 2 1/4 (1/4)
" 4.....	41	4,592	125	15 1-16, 36 (1/4), 13 11-16 (as below)

Anything but a good record, it will be seen. The slidometer record for No. 4 stop was especially bad, and resulted in the Widdfield & Button withdrawing from the emergency run which should have come next in order. The slidometer record of the last stop was as follows:

14 1/4	4 1-16
5 1/2	8 1-16
4 1/2	1
4 1/4	7 1/4
2 1/2	6 1/2
0 1-16	9 1/2
1 15-16	8

The disgusted train then broke in two at the third car from the rear, knocking the mouth off a Potter drawbar; and the way-car was knocked back off the forward truck, badly bending the centre-pin. The train, however, hauled through the yard without the shocks which had attended its slow movement with all cars braked.

The Westinghouse 25-car runs, rear 12 cars cut out, were then taken up, and resulted as follows:

TEST NO. 4.				
Service.	Speed.	Distance.	Time.	Impact gauge.
Stop No. 1.....	20 1/4	688	36 1/4	3
" 2.....	41	1,652	46	9 7-16 in.
" 3.....	26	980	38 1/4	7 1/4
" 4.....	41 1/4	2,672	71 1/4	8 1/2

Emergency.

TEST NO. 5.				
Stop No.	Speed.	Distance.	Time.	Impact gauge.
1.....	24 1/4	770	31 1/4	8 1/4 in.
" 2.....	43 1/4	1,090	48	9 1/4
" 3.....	24 1/4	680	30 1/4	10 1/4
" 4.....	40 1/4	2,650	59 1/4	8 1/4

It will be seen that there was but little difference either in the stops or in the impacts between these two runs, again illustrating that it is only as trains grow longer than about 30 cars that the impacts become very serious with fairly good power brakes. As a whole, the day was remarkably free from casualties to rolling stock and from severe shocks to the occupants of the rear car.

Friday, July 30, was a less fortunate day as respects breakage, but one of the most important of the whole as respects the results of the tests. The severe shocks experienced with 50-car trains with loose couplings had suggested some days before that a test should be made of the effect of tight couplings, so far as its effect could be imitated by blocking the slack out of the links. The Westinghouse train of Burlington & Quincy cars, from which the severest shocks have been received and which likewise had the most slack, was selected for the test. For the test a lot of 3 in. scrap arch-bars were cut up into pieces about 12 in. long, punched and riveted together near the centers, making a very snug fit in the links. No trouble was experienced from their jumping out, and they took out 3 in. of 3 1/2 full slack. The result was certainly very decisive and convincing.

The train was made up of 49 empty cars, or within one of the same number as had been used in the earlier empty cars emergency runs. The occupants of the rear car were substantially the same as those who had taken the first runs in the same location on the train and it may be safely surmised that every one of them hoped in his heart that the 3 in. blocks would prove reasonably efficacious. Of one of the occupants we are in a position to assert this with absolute certainty. Their hopes were not disappointed, as the following record shows that, while the stops were on an average quite as good as the previous emergency stops, the shocks were of the following mild and gentle description.

Test No. 1. Westinghouse, 40 empty car trains, emergency stops, close couplings.

Stop No.	Speed.	Distance.	Time.	Impact gauge.
1.....	22	418	18 1/4	18 7-16
" 2.....	39 1/4	959	24 1/4	15 1/4
" 3.....	26	513	19	19 1/4
" 4.....	43	1,106	25 1/4	21 1/4

A 20-in. bump will throw a car-load of stock toward one end of the car in very energetic fashion, but is a very different affair from a 20-ft. bump, at which figure the Westinghouse loose-coupling shocks were estimated in our account of the slidometer, the invention of which was the result of them. That, however, was before a large experience in taking bumps had educated the rear car party as to the easiest way to take them, and on a comparison of views it is now their unanimous opinion that the shocks were really about 10-ft. shocks.

The amount of slack in the C., B. & Q. cars is unusually large, and may be estimated for each train about as follows:

In link.....	Loose slack.
From bending of pins and occasional slack springs in draw-bars.....	3 1/2 in.
In springs, 3 1/2 in., total motion in 15,000 lb. springs, all of which (and considerably more, if there were more) is beyond question used up in every shock, but with a diminution of the force of the blow, so that the 4 1/2 in. of spring slack may be estimated as the equivalent in free slack of.....	2 1/2 in.
Total free slack or equivalent.....	6 1/2 in.
Of which there was taken up by the blocks.....	3 in.
Leaving in close coupled train, per car.....	3 1/2 in.

Or nearly as may be half as much free slack, with the result that, with a 50 empty car train:

6 1/2 in. of free slack, 27 ft. in the train, give an impact at the rear of.....	120 in.
3 1/2 in. of free slack, 14 1/2 ft. in the train, give an impact in the rear of.....	20 in.

A more convincing demonstration that much slack produces injurious shocks in the train could hardly be made.

This test was quite apart from the brake tests proper, and was made only because all the men, material and appliances were at hand to test one aspect of a question which the brake tests proper had shown was important as respects the handling of the brakes. Chairman Rhodes therefore very speedily decided to make the test even at the cost of lengthening out the already long and costly brake tests, and taking more of the severe shocks, of which he has taken far more than any other man on the ground.

One test, however, suggests another. Freight cars are not built primarily, as we said last week, for the sake of stopping them easily, but for the sake of starting them and hauling them easily. It has, therefore, been decided to make a still further test, aided by the skilled personnel and technical facilities on the ground for another purpose, to determine definitely just how much, if any, difference the loss of that amount of slack makes in the starting power of engines. This test, which will not be second in importance to the brake tests proper, will be made in the most thorough way, and will for the first time shed some definite and trustworthy light on this question. To make such a test properly is difficult, and while many hasty and more or less careless tests have been made, it is questionable if any have ever been made before in a way to give reasonably trustworthy results.

The second run was the Westinghouse 50 empty car run (actually 49 cars), service stops, rear 20 cut out. Loose links were used, as in all the other regular tests. The fiftieth car was unavoidably absent, having its portrait taken for the *Railroad Gazette*, together with one car each of the four other trains.

* The common accident with the C., B. & Q. cars happened at stop No. 2. A centre-plate and centre-pin were broken on the fourth car from the rear, displacing the truck which was held by the body-bolster, side bearings bearing against the wheel, precisely as had happened a number of times before in cases of severe shock. The centre-plates (no longer standard) are small, weak and bevelled slightly so as to be easily displaced.

Westinghouse brake service stops, 49 cars, brakes on 27 cut out of 20.

Stop No.	Speed.	Distance.	Time.	Disc.
1.....	21 1/4	535	23 1/4	23 1/4
" 2.....	38	1,232	32 1/4	23 1/4
" 3.....	22	639	26 1/4	16 1/4
" 4.....	30	1,238	32 1/4	43 1/4

All went smoothly in this test, except that the bumps at last stop, and, in fact, all of them, were unusually severe, which was afterwards explained in part on learning that the engineer supposed he had brakes on all the cars. The immense importance of training in the use of the brake for freight service, however, was illustrated in this test, since the contrast in the quickness of stops Nos. 2 and 4 by no means corresponds with the violence of the shocks. A difference of some 200 ft. only was legitimate on account of the difference in grade. To save that 260 ft. the shock was twice as violent. Many still more striking evidences which the handling of the brakes have on the shocks will be collated later.

A still more striking fact to be extracted from this record, and especially from the following, is that to all appearance the brake is as efficient when applied to only half the train as when applied to every car. In other words, the brakes on the rear half of long trains do no particular good, retarding the application of the brakes ahead almost enough to make up for all the work they do later. Positive evidence of this fact will appear in the brake-rod diagrams we shall publish shortly, and its importance cannot be over-estimated. Comparing the close-coupling emergency stops with brakes on all cars with those for service stops just given with brakes on only half the cars, the fact is indicated, which the following proves positively.

Second run of same Westinghouse train, 48 cars, rear 20 cut out, making emergency stops:

Stop No.	Speed.	Distance.	Time.	Impact gauge.
1.....	21 1/4	379	17 1/4	3 bumps, 49 1/4
2.....	37	927	25 1/4	2 bumps, 51 1/4

And sheared the way car king-bolt off, displacing the truck in precisely the manner described in the preceding foot-note. The king-bolt in the sixth car from the rear was likewise found broken, and on pulling into West Burlington for repairs, both king-bolts of the way car were found to be broken making three on this trip. Runs for the day were therefore necessarily discontinued.

Stop No. 1 had done no real damage, and its 4 ft. bump could hardly be called a really bad one for a Westinghouse emergency, but it was bad enough to throw two of the Westinghouse representatives clear to the head of the train, leaving the Westinghouse Co. no means of judging how bad the shocks of stop No. 2 were except to consult this journal. Similar accidents have happened to some of the other brake representatives, who have not as a whole shown any anxious desire to take their own bumps.

A striking contrast in this respect was Railroad Commissioner L. S. Coffin, of Iowa. No one can consider it to be in any way the duty of a railroad commissioner to do more than to keep a general run of such tests, and perhaps try a trip or two, but Mr. Coffin turned up early in the tests in the rear car, and there he has been through all the tests, quiet, unassuming, saying nothing to any one, and taking the knocks as they came, with a view of understanding for himself what there was in the brake question. Mr. Coffin is no longer a young man, but with the exception of Chairman Rhodes and the rear train crew has been more constantly in the rear car than any other one person, and his quiet fidelity in the disagreeable process of qualifying himself to talk on a public question before he began to talk about it won him general respect. It is safe to say he knows more about the action of power brakes on freight trains than any railroad commissioner in the country, and than most of the railroad men.

Saturday, July 31, the uncompleted Westinghouse 50 empty car emergency run, brakes on rear 20 cars cut out, was completed, these stops likewise being decidedly better than the very best emergency stops which had been made with brakes on all the cars. Another king-bolt was broken at the No. 4 stop on the ninth car from the rear, but no displacement of truck occurred.

Two runs of the American brake with 25-car mixed trains, rear 12 cars cut out, then followed, the first run with service stops and the second with emergency stops. Both showed fairly good results, comparing well with the similar Westinghouse runs except on the grade stops (in all these tests the engine brakes do most of the work and it always does far more than its share), and showing, as have all the American 25-car stops, no seriously objectionable shocks. It has also been noticeable that in all the tremendous shocks to which the American brake-gear has been subjected not a single part has broken or given out. The company is therefore entitled to the credit of having come here with a thoroughly serviceable and mechanical device for 25-car trains, which a rational man might rationally favor even if it was not absolutely the best. It was the 50-car trains which Chairman Rhodes sagaciously insisted on having in the face of opposition from many quarters which have rendered all parties the service of timely revealing difficulties which might have remained undetected till far more serious losses had been incurred.

The same can by no means be said for the Roté brake, which followed the American brake with its "first regular test" of 25-car mixed train emergency stops, all cars braked. The record makes clear, what the cold brake-shoes on the rear five-eighths of the train made clear, that the car brake does simply no work at all, and comparing its stops with those just preceding of the American and Westinghouse, it will be seen at once how very large a proportion of the work is done by the engine brakes. To those who remember the repeated

loud challenges of the Westinghouse which were scattered broadcast through the country by the Rote brake this entire fiasco will be sufficiently amusing. The Rote people still have hopes, however, and wish a second chance to try a new adjustment before finally admitting that their brake is not a brake.

The day's work closed with an Eames 50 empty car service run, 20 rear cars cut out. The stops will be seen to be almost identical, perhaps a shade better, than the Westinghouse runs, except at the stop No. 4, which follows close on No. 3, and where the Eames vacuum has shown a frequent tendency to give out. We shall hereafter present the records of the gauges more fully, pending which drawing definite conclusions is hardly fair.

At the first stop on this run the usual "I. D. & S." pin jumped out between the last car and the way car. It was tied down with a rope. At the fourth stop the rear trucks of the fourth and tenth cars from the rear both jumped the track, as nearly as could be judged, from the effect of the 35% bump, and ran 900 ft. on the ties, both trucks keeping parallel with the rails. It is noticeable that the only two derailments which have occurred during the tests have been to the same train at the same point, although many severer shocks have occurred. The cars are the lightest of any on the ground.

The following is the record for the day, given for the first time with the system of numbering which has been recently adopted, the hundreds indicating the day of the tests (in this case the 17th), the tens the successive trips of each day, and the units the number of the stop. The advantage of this system of numbering is that every one knows just what number to give a note or record regardless of what has preceded.

The remaining work of the brake-tests proper is very little, but they will be followed by the important close coupling tests elsewhere alluded to. All will have been completed before this issue reaches most readers—we trust in time to permit a telegraphic summary of the results of the coupling tests to appear in it.

Westinghouse 50-car emergency run, brakes on rear 20 cut out, empty cars.

Stop No.	Speed.	Dis- tance.	Dynam. car.	Way car.	Bumps.
1713	20	451	0 21½	0 21	24½
1714	37	1077	0 30	0 30½	45 1-16 0 3-16 0 0%

On ninth car from way car there was a broken king-bolt. No displacement of truck.

Westinghouse 50 empty car service run. All brakes on.

1721	20½	1005	0 41	0 41½	0
1722	37½	1175	0 29½	0 29	8
1723	22	944	0 33½	0 33	2½
1724	40	1712	0 35½	0 34½	6

American 25-car mixed run, 12 rear cars cut out.

1731	22½	805	0 37½	0 37½	15-16
1732	37½	2130	0 67	0 66	1½
1733	24	1379	0 60	0 59½	0½
1734	41½	4917	2 14	2 16	2½

Same train, emergency stops.

1741	23½	760	0 34	0 34½	2½
1742	37½	1885	0 60½	0 61	5½
1743	24	1184	0 52	0 52½	6½
1744	41	4941	1 57	1 59	0 1-64 0 9-16

Rote 25 mixed car train, first general test.

1751	23	880	0 40½	0 43½	3 9-16 5 9-16
1752	37	2175	1 17½	0 75½	4½
1753	24½	1207	0 64	.....	0 5-16 4 15-16
1754	40	over 4500!	2 8½	2 10	.....

Hand brakes used for the 1754 stop, the train being moving at a velocity of about 22 miles per hour when it passed the distance post.

Eames 50 empty car service run, 20 rear cars cut out.

1761	21½	544	0 25	0 23½	37½ 2
1762	36	1213	0 33½	0 34½	27½
1763	20	614	0 29½	0 28	15 11-16 35 5-16
1764	39½	1709	0 45½	0 44	0½

The second brakeman from the rear applied two hand-brakes and the rear brakeman four, to assist in stopping train, when it was seen that derailment had occurred.

A Correction.

A dispatch on the Burlington brake trials in our last issue, as printed, said: "The claim is advanced that cutting out the 20 rear cars would cure this action. I asked for, this will be tried." The latter sentence should read, "If asked for, this will be tried."

Contributions.

Fast Tunnel Driving on the New Aqueduct.

NEW YORK, July 22, 1886.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Shaft 18½ south on the tunnel for the New Croton Aqueduct, has won the first prize offered by the contractors for the fastest driving during the month between May 25 and June 25 just ended. Machinery used, Rand compressors and Rand slugger and Little Giant drills.

Following are the facts: May 18, O'Brien & Clark, the contractors, issued the following notice to shaft superintendents:

"We will offer a prize of \$500 to our employés on the new Croton Aqueduct, to be awarded as follows:

"Three hundred dollars to the gangs of men who shall between May 25 and June 25 complete the greatest number of lineal feet of tunnel in the most satisfactory manner, and two hundred dollars to the next best. In computing the quantities the Division Engineer's measurements will be taken; as regards the quality of work, our engineer, Mr. W. M. Hall, will be the sole arbiter. Allowances will be

made by him for tunnel that requires to be timbered, and special attention will be paid as to whether excavation is kept within the required lines."

Shaft 18½ is included in section 9, under charge of the well-known firm of Paige, Carey & Co. Section 9 at 18½ is 20 ft. 10 in. wide at bottom and 18 ft. high, heading being 7 and bench 11 ft. high; there are 14 cubic yards of rock to the lineal foot, and the ground is very bad, requiring timbering all the way through. As against the sections where no timbering is used, the engineers allowed 1 ft. of tunnel at 18½ to be equal to 1½ ft. where no propping is done.

Shaft 18½ south drove in the month named:

Heading, 205 ft.; bench, 175 ft.; equivalent in untimbered sections which competed against 18½ to heading, 205 + 102.5 = 307.5 ft.; bench, 175 + 87.5 = 262.5 ft.; or in round numbers, an amount of work equivalent to 290 ft. of full tunnel of the standard section of untimbered tunnel which contains about 7 yards rock against 14 yards rock at 18½, to the lineal foot.)

The timbering consisted of five-piece sets placed 5 ft. apart from centre to centre, and logged on the arch; 132,000 ft. of lumber were used in timbering during the contest.

This is not all: The tunnel was beautifully cleaned as they went along, and ditched all the way through.

This remarkable piece of work at 18½ South ranks as the foremost in the whole history of modern tunneling. It has been accomplished under the immediate superintendence of Mr. Lon F. McAleer, General Superintendent for Messrs. Paige, Carey & Co. Well may he be proud of it and of his whole work at Section 9. As able assistants in this stupendous piece of work were Mr. Frank Moran, walking boss, and Messrs. John Duffy and Ed. Sheridan, heading bosses.

This remarkable piece of tunneling work was accomplished with three No. 13 Slugger Rand drills and two No. 3 Little Giant Rand drills.

Last year the Rand drill at shaft 20 won the other prize offered by the contractor.

Shaft 23 got the second prize, having been driven 265 ft. 6 in. in the month named with Ingersoll drills, but as this also beats the record, it was awarded \$300 too, instead of the \$200 promised.

Last year 254 ft. won by the Rand at shaft 20.

Culverts.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I should like to have your opinion and also that of your readers regarding the relative worth of the two different plans for box culverts as shown below:



Fig. 1.

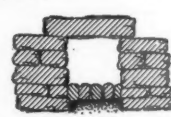


Fig. 2.

Culverts.

According to the plan shown in Fig. 1, the entire width occupied by the culvert is paved and the side walls rest directly on the paving.

According to the plan shown in Fig. 2, the side walls rest directly on the natural foundation, and the space only between the same being paved.

[The use of paving material as a foundation would hardly appear correct, but possibly under certain conditions there may be certain advantages in the plan shown in Fig. 1. We shall be glad to hear from those who have paid some attention to this point.—EDITOR RAILROAD GAZETTE.]

Answers to the "Mechanical Conundrum."

TAUNTON, MASS., Aug. 2, 1886.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In reply to your "Mechanical Conundrum," page 520 *Railroad Gazette*, would say that in both instances the wheels would roll in the direction in which the power is exerted; or, in other words, they would revolve toward the power, and wind the rope up on the axle.

JAMES E. GREENSWICK.

[We have also received replies to the same effect from C. S. Ferrer, J. A. Beamer, I. R. Giblin, and Messrs. Whittlesey & Wright. None of our correspondents state, however, whether they have obtained this result by reasoning from mechanical principles or from actual experiment.—EDITOR RAILROAD GAZETTE.]

NEW YORK, Aug. 4, 1886.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In answer to the conundrum in your issue of July 31, I submit the following:

Instead of pulling the rope toward you, let us consider the condition of things when the rope is stationary and fastened to some stationary body, and a person tries to move the wheel in the opposite direction to where the rope is fastened, and let us suppose that such a person has succeeded in making the pair of wheels unwind one revolution of the rope from the axle. Supposing the wheel 2 ft. in diameter and the axle 3 in., we have moved the centre of the axle 9.4 in. from the position it first occupied, and consequently we have moved the system of wheels just the same distance; the wheels which should have revolved once the circumference (75 in.), has made its revolution in the space of 9.4 in., and has revolved in one-eighth the distance which it would take had it rolled away naturally. Thus we will have to overcome the resistance due to the friction of the rail and make the wheels revolve in almost the same space (nine inches) as if

they revolved standing still. Knowing that we have to overcome this friction, what will happen if we pull the rope?

This resistance will cause the fulcrum or centre on which the system of wheels revolves to be at the point of contact of the wheels and the rail, instead of at the centre of the axle; the force of pulling the rope will be increased by the amount of leverage produced by the rope's perpendicular distance from the rail on the axle, and will cause the system of wheels to roll toward the person pulling or exerting the force, winding the rope on its axle as it rolls.

On an incline the wheels will roll in the direction of the force just so long as this friction on the rail is sufficient to cause a fulcrum at the point of contact. On an incline of one in ten, I would say that the wheels would move with almost the same ease as on a level, except that force would have to be exerted to act against the force of gravity.

R. M. P.

Piece Work.

IV.

METHOD OF INTRODUCING IT AND FORMING A SCHEDULE OF PRICES.

It is difficult to lay down rules for the introduction of piece work which will be applicable to all shops.

The quantity of work and the facilities for doing it vary greatly with different shops. This and other causes, which will be mentioned further, may require a modification of the methods successfully employed in one shop, in order to adapt them to the different conditions existing in another.

The first point to be considered is the capacity or efficiency of the machine tools. The prices paid for work, or in other words its cost, will vary as the efficiency of these is greater or less. For instance, the cost of planing one pair of cylinders, on a machine designed many years ago, has been found three times as great as if done on one of the modern tools. The same difference will be found in the cost of boring a pair of cylinders on antiquated machines, instead of on tools designed for the purpose and manufactured more recently.

The same line of investigation will develop the relative advantages or disadvantages of all other machines in each shop. The exact knowledge of the efficiency of tools is absolutely necessary, and should precede any attempt at introduction of piece work. Again, existing methods of handling work, from one machine to another, should be carefully scrutinized and simplified, if necessary, in order that a workman may not be delayed by having to call upon laborers for any assistance he may require.

The extent of these differences in the facilities and efficiency of tools will therefore require that each shop make its own schedule of prices, based upon such efficiency, for, it must be evident, that prices which would be just for one equipped with good modern tools, would not be sufficient for another not similarly favored.

The labor involved in framing a reliable schedule of prices is considerable, and may be increased, or diminished, with the extent of the judgment, or the good or bad methods employed by the person who seeks the information.

We will offer some suggestions, which have been already tried and found to aid materially in obtaining prices and in introducing the system.

The establishment of certain divisions or specialties in the work will be found necessary and profitable.

It is scarcely necessary to state that in making such divisions care should be taken to embrace in each only such work as will best suit the ability of the workmen who will be expected to finish it. This, of course, is equivalent to a classification of the force according to the efficiency of each individual. From this results the advantage of training men for special purposes, each of whom becomes an expert in his particular branch, and is therefore better able to produce speedily and cheaply.

This arrangement will also greatly assist in obtaining reliable prices. It is evident that if a workman is given a job or assigned to a machine with which he is not familiar, the cost of his work will be excessive. If the price is based on this result and is given to another better qualified for the same work than the first, it will be too large.

Though piece work is profitable in all railroad shops, it is more so in larger shops, having superior facilities, and which engage more extensively in the construction of parts either for new locomotives or for renewals of such as are broken in service. The greater the number of parts finished in each lot, the cheaper they can be produced. A workman can make better time in finishing six pieces of the same kind than he can in completing six of different kinds. This is a disadvantage to the smaller shop, which is necessarily restricted in the number of parts required. It would, therefore, be very desirable, on account of the profit arising from the practice of manufacturing in lots in large shops, to carry the same practice into a small shop, as far as it is possible to do so. The wisdom of this course may not be apparent to all, and the question may arise whether it is profitable, in other ways, to manufacture parts of locomotives for stock. We think it is, to the extent of keeping only that number necessary to meet the requirements for a reasonable length of time. This may be objected to, on account of the amount of money required to be invested in such stock, to meet possible future emergencies. This objection is well raised only when the quantity carried is in excess of reasonable requirements. The determination of the proper limit in the stock to be carried is best made by the judgment of the person charged with the duty of maintaining engines or cars in proper condition for service. It will be in proportion to the number of each to be cared for, and also to the known frequency of failure of certain parts. If the rolling stock be of a uniform type, and the parts interchangeable, there can



Published Every Friday.

EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

THE CHICAGO & NORTHWESTERN REPORT.

The Chicago & Northwestern Railway Company now works more railroad than many whole states have. With the two large systems which it controls by the ownership of their stock, but does not work directly, it has 5,920 miles of road, which is nearly as much as there is in all Italy, with its 29,000,000 of people, and very nearly as much as in Belgium, Holland and Switzerland together, which have 12,800,000 inhabitants. Its lines are in six states and two territories, the westernmost point being as far west of Chicago as Chicago is west of New York. Probably no other company in the world has so many separate long lines—from Chicago to Lake Superior, to St. Paul, to Council Bluffs, from Winona across Minnesota and Dakota to the Missouri River at Pierre; from Sioux City entirely across the whole length of Nebraska and into Wyoming; from Lake Superior at Superior and Washburn, southwest through St. Paul and Minneapolis to Omaha, in a territory 425 miles from north to south, and nearly a thousand miles from east to west. It is one of the great railroad systems of the world, and, from its position on the frontier, necessarily a growing one.

The system which it works directly, at the close of its last fiscal year, May 31, measured 3,949 miles, while in 1877 it had 1,993, so that it has been very nearly doubled in ten years, aside from the acquisition of the control of the St. Paul & Omaha and the Fremont, Elkhorn & Missouri Valley systems.

There has been comparatively little change in the gross and net earnings of the road worked since 1881-82, though the length of road has increased 858 miles, or 28 per cent., meanwhile. The passenger traffic has not grown; and though the freight traffic last year was 23 per cent. more than in 1881-82, the gain in traffic has been largely offset by a reduction of nearly 20 per cent. in the average rate.

While the progress in earnings since 1881-82 has been slow, last year is notable for a favorable change. Passenger traffic in 1884-85 was much smaller than for two years previous; last year about one-third of this loss was recovered; the increase in freight traffic last year, it is true, was the smallest for many years; but, on the other hand, a stop was put to the reduction in the average freight rate, which fell 8 per cent. from 1883 to 1884 and 9 per cent. from 1884 to 1885, and the freight earnings last year were nearly equal to the largest ever made.

The statement of interest charges in the report gives the excess of interest paid over interest and dividends received. The receipts are chiefly dividends on St. Paul & Omaha preferred stock, and the interest on 6 per cent. bonds of controlled lines for which the Northwestern has issued its own 5 per cents., and recently

4 per cents. The rentals have disappeared because of the purchase of the leased lines, and in place of rentals there is now the dividend on the shares paid for them and the interest on the bonds, formerly paid by the lessor out of the rental. The recent acquisitions, aside from these Iowa lines, have light interest accounts per mile of road, some of them only \$750 per mile.

It will be seen that the increase in working expenses last year was only $\frac{1}{4}$ per cent., though the mileage worked increased 1.9 per cent., the passenger traffic $3\frac{1}{4}$ per cent., the freight traffic 5 per cent., and the train mileage $3\frac{1}{4}$ per cent.; thus nearly the whole increase in gross earnings was added to the net earnings, which increased $7\frac{1}{4}$ per cent.

The maintenance expenses have been, for five years:

Maintenance of				
Year to May 31.	Road.	Structures.	Cars.	Loco. motives.
1882...	\$5,518,320	\$1,056,099	\$980,298	\$805,863
1883...	2,278,839	1,094,156	1,393,632	928,468
1884...	2,616,427	974,491	1,491,631	957,575
1885...	2,196,821	742,430	1,269,036	924,188
1886...	2,214,764	772,191	1,238,095	891,116

The increase last year in the total of these over the year before is somewhat greater than the total increase in expenses, and amounts to $\frac{1}{4}$ per cent., yet they were less than in any of the other years—even less than in 1881-82, notwithstanding the increase of 28 per cent. (858 miles) in road meanwhile.

The reduction in maintenance of cars and locomotives has not been considerable, but it has been large in road and especially in "structures" (buildings, bridges, fences, etc.). The decrease in maintenance of road expenses is due chiefly to the smaller cost of rail renewals, which has been:

Year to May 31.	1881-82.	1882-83.	1883-84.	1884-85.	1885-86.
	\$702,247	\$297,625	\$403,228	\$177,437	\$222,074

If we take this from the total cost of maintenance of road, we shall find a large increase in the other expenses since 1882, and very little variation in the other years.

The reduction in cost of rail renewals is very largely due to lower prices, for the tons of new steel rails used has been:

Year to May 31.	1881-82.	1882-83.	1883-84.	1884-85.	1885-86.
	23,414	11,174	19,989	9,939	16,701

More than four-fifths of the road was laid with steel at the beginning of last year, and most of this had not been laid long enough to require renewal. The quantity laid last year was above the average of the four years previous, though the cost was little more than half the average. The reported cost this year was \$57 per mile of road, \$51 per mile of track and 1.7 per cent. of the total expenses. This item, formerly so large, has become comparatively insignificant, the cost of new rails being largely offset by what is received for the old ones. Last year on the Northwestern, for instance, the value of the rails put into the track is given as \$628,968, half as many old rails as new ones being laid, but the value of the rails taken up was nearly two-thirds this amount.

Tie renewals for two years have cost the Northwestern more than rail renewals. The number of ties used has varied less than the quantity of rails, having been:

Year to May 31.	1881-82.	1882-83.	1883-84.	1884-85.	1885-86.
Total...	314,896	758,244	1,072,465	825,879	975,880
Per mile...	274	198	230	192	221

The renewals last year were about equal to the average for the five years. It is noticeable that this average will renew the whole in about $11\frac{1}{2}$ years, which is fully one-half more than the average life of ties is generally reported to be. Data of other railroads also have shown a similar long life of ties.

The cost of new ties and the cost per tie have been:

Year to May 31.	1881-82.	1882-83.	1883-84.	1884-85.	1885-86.
Total...	\$77,916	\$272,163	\$371,612	\$302,293	\$335,668
Per tie...	30.1 cts.	35.9 cts.	34.7 cts.	36.6 cts.	34.4 cts.

The cost of labor for laying ties last year is given as \$142,845, or 14.6 cents per tie, making the whole cost 49 cents per tie. The cost of labor for laying rails was but \$52,676, or \$2.17 per ton laid; and including labor tie renewals cost \$274,750, and the renewals \$478,512. Thus the latter was the greater by nearly three-fourths. It would hardly have been supposed that tie renewals would cost more than rail renewals on a road like this, which has many lines through a wooded country, but this must be true of many railroads now.

Other principal expenditures of the Chicago & Northwestern have been:

Year to May 31.	1881-82.	1882-83.	1883-84.	1884-85.	1885-86.
Fuel...	\$1,598,383	\$1,937,235	\$2,033,937	\$1,809,779	\$1,559,530
Wages...	3,947,082	4,354,027	4,751,470	4,765,275	4,931,003

Fuel, thus, cost less and wages more last year than in any of the five. The wages do not include those of the road and shop employees. Of the increase of \$1,230,000 in the total working expenses since 1882, \$1,005,000 has been in the above wages, and these have increased \$578,000 (13 $\frac{1}{2}$ per cent.) since 1883, while the other expenses have decreased \$791,000 (8 per cent.).

The reduction in the cost of fuel within two years is alone nearly enough for 1 per cent. on the stock. This is due almost entirely to a fall in the cost of coal to the company from \$2.58 to \$1.96 per ton, the change

in the train mileage per ton having been very small. The company had the use of its new road to its Illinois coal mines near La Salle only for about half the year. The cost of fuel per engine mile, however, was much greater in 1882-83 than in previous years, having been, in cents:

Year to May 31.	1880.	1881.	1882.	1883.	1884.	1885.	1886.
	0.76	7.70	8.80	9.67	9.28	8.23	6.91

so that the present low cost is only a return to old conditions.

The prospect for the current year is in some respects less and in some respects more favorable for this road than it was a year ago. Then there was a fair wheat crop and fine crops of other grains on the lines which it serves; now the wheat crop is much lighter and the corn crop does not promise so well. Then the movement of iron ore—a very important business for this road—was light until near the close of the season, and the lumber business was the duller for years; now there is a very heavy ore movement and a larger lumber movement than last year. The prospect for an early rapid settlement of Dakota and the other country on the new lines of this company was not good a year ago and it is not now, though it looked more favorable a few months ago. The poor crops this year are likely still further to postpone the time when this country will develop. Not that it does not grow. It does, and will continue to; but there is not the rapid growth which there was a few years ago, and which, if continued for a few years, would very greatly increase the traffic of the railroad.

IMMIGRATION AND POPULATION.

The number of immigrants arriving in the United States in the month of June has been reported as follows by the Bureau of Statistics:

Year.	1881.	1882.	1883.	1884.	1885.	1886.
	95,535	84,706	75,034	55,678	41,128	44,043

Thus the arrivals were slightly greater than last year, but much less than in any of the other five years. The arrivals from Canada, however, were not reported for this year or last, while they were estimated in the previous years, and the Canadian authorities claim very much over-estimated, including the immigrants to Manitoba, which in some years were very numerous.

For the half-year ending with June the arrivals have been:

Year.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.
	99,224	263,726	388,511	441,065	321,845	271,493	205,321	207,827

Thus though there was scarcely any increase in the immigration this year, which perhaps was to be expected because of the expectation of a better demand for labor at the close of last year and the beginning of this, it no longer decreased as it had been doing rapidly since 1882, and it was actually large, as will appear better from the following statement of the arrivals in each of the last 20 fiscal years ending with June:

Year.	Immigrants.	Year.	Immigrants.	Year.	Immigrants.
1867...	298,967	1874...	313,339	1881...	669,431
1868...	282,189	1875...	227,498	1882...	788,992
1869...	352,708	1876...	169,886	1883...	596,114
1870...	387,233	1877...	141,857	1884...	509,834
1871...	321,350	1878...	138,469	1885...	348,030
1872...	404,806	1879...	177,826	1886...	328,917
1873...	459,803	1880...	457,275		

Thus the arrivals last year, though the smallest since 1878-79, were exceeded only in four years of the period of heavy immigration after the war, when it was the greatest known up to that time; and was but slightly exceeded in the four years from 1851 to 1854, after the Irish famine, when it was enormously greater than had ever been known before. That is, what seems to be the low-water mark in the tide of immigration now is not much below the high-water mark previous to this decade.

Relatively, doubtless, the immigration is much less important now than in 1873 and still less than in 1851-54, because the total population is so much greater now. The arrivals last year, though equal to a city as large as Baltimore, make up only 55 out of every 10,000 inhabitants now in the country, and for every 100 immigrants arriving there were probably 356 added to the population by the excess of births over deaths. In 1851 the natural increase of the population was only about 122 $\frac{1}{2}$ to every 100 immigrants, and the latter made up as many as 158 out of every 10,000 inhabitants, or nearly three times as many as last year. Still it was hardly to be expected that the immigration should continue to be so large, for it depends upon the capacity of Europe to supply as well as the ability of this country to absorb population, and Europe does not grow very fast. The perfection and cheapening of the means of transportation, however, have greatly reduced the obstacles to immigration, and the enormous number of recently arrived Europeans here—more than 3,700,000 having come within the past seven years—at once forms an attraction for their friends and relatives left behind and furnishes them the means of getting here. There is scarcely a corner

of Europe west of Russia which has not representatives here, and opportunities for employment become known in Italian, Hungarian, German and Scandinavian hamlets almost as soon as they occur. The young people look to emigration to America as the easiest, quickest and best known way of bettering themselves, and are brought up, as it were, with that in view as means of relief, at least if times should go hard with them.

The ease with which the European poor can reach this country, and the diffusion of information concerning it, are likely to have a profound effect here, tending to equalize the condition of workmen on the two continents, just as the cheapening of transportation in this country has equalized the prices of land in the East and the West. If the workman can do much better here than in Europe, he will come here, because it is easy to come. It is not probable that hereafter the difference will be as great as it has been heretofore, though it does not follow that the American workman's condition will grow steadily worse; for free immigration tends to make the condition of the European workman better. But that the advantage is still largely with this country last year's immigration plainly shows. It was not a very prosperous year, and the condition of workmen seems not to have been, on the whole, particularly favorable here; though doubtless the proportion of men employed was greater than it had been, and wages were advanced somewhat in many callings; yet we see that it was so much more attractive than the conditions in Europe as to induce 329,000 people to come here.

By the method of calculating the population which accounted for the increase from 1870 to 1880, that is adding 2 per cent. plus the immigration as the increase in each year, the population of the United States, June 30, was 59,961,000, and the increase since the census of 1880 has been 9,800,000, or 19.6 per cent. It is almost incredible that there should have been so great an increase in three-fifths of the decade, and there are some errors in official statements which tend to exaggerate the increase, namely, the incompleteness of the census in the South in 1870, which made the population too small then, so that the accurate census of 1880 indicated an increase greater than the actual increase. This error was important in a few states, but it would not make much difference in the yearly percentage of increase of 2 per cent. for the whole country. Again, the reports of arrivals of immigrants since 1879 have apparently included a large number as immigrants to the United States by way of Canadian ports who were actually immigrants in transit to Manitoba. Moreover, in the long run, the natural rate of increase tends to decrease. On the other hand, the immigrants arriving are doubtless much more productive than the average of the population, including fewer of the very young and comparatively very few of those who have passed the child-bearing age. Moreover, as we have shown recently, the statistics of production and exports of food in this country indicate an enormous increase in the home consumption at a time when, apparently, the mass of the population was less rather than more able to live freely. Thus, while the estimate of the increase in population and the total population may be considerably in error, and there are some things which tend to make it too large, it is the most probable one for which we have any basis, and may possibly err in the other direction. The state censuses for 1885 are too few to check our estimate effectively. Nine states and two territories, with 16 per cent. of the population in 1880, gained 23.4 per cent. in the five years; but these include more of the newer than of the older states. So far, the growth has been apparently much greater than the average rate of growth in the 1870-80 decade. With the immigration for the next four years no larger than last year, our basis of calculation would make the population by the census of 1890 about 66,300,000, or 33 per cent. more than in 1880, while the increase from 1870 to 1880 was 30 per cent.

The great reduction since 1880 in the quantity of fertile agricultural land offered free to settlers is likely to have an important effect in checking the growth of population hereafter. Ever since the settlement of New England, every new generation has sent swarms from the old homes to occupy virgin territory, where with very little capital the son could soon make a farm as large and often more productive, and eventually more valuable than the paternal homestead. After the French war before the revolution there was such swarming from New England to Vermont and East Central New York; after the revolution this continued, and extended to Western Pennsylvania, New York and Ohio; about 1840 the swarming to the prairies of the

Northwest began, which has continued ever since, Iowa, Kansas and Minnesota being peopled very largely from Ohio and Michigan, while in recent years Illinois, Wisconsin and Iowa itself have sent swarms to Dakota and Nebraska. Now the settlers everywhere face the borders of the grazing plains, where agriculture is impossible or very hazardous; and to find fertile homesteads free the rising generation must go to Northern Dakota or to Eastern Oregon and Washington, and there find many before them. This pioneering has been the work of native Americans to an extent not generally appreciated. It has been caused not so much by the prospect of making a better yearly income for the first few years as by the probability that the wild land got for nothing or for \$1.25 an acre before the homestead law, would in the course of 10 or 20 years become worth \$25 to \$40 an acre, aside from the value of the improvements put on it. These prizes offered to all who come, and which Americans have come to feel as the natural opportunity of every farmer's son, cannot be had much longer, and when they are gone much that has made this country attractive to the poor of Europe will have disappeared. The emigrating American has made room for the immigrating European, and when the tempting land is no longer offered, Americans must busy themselves more with those industries which have heretofore been left largely to European immigrants.

The various railroads interested have all at last agreed to pool the business at all the places in the territory in the Central Traffic Association where pools are thought necessary, and to submit their claims for shares of the traffic where they cannot agree. Only at Chicago and St. Louis, however, has there been a division, we believe, so that it is not quite accurate to say that the east-bound freight is actually pooled. There is a certain stage in the history of railroad coöperation when an agreement to pool is about as effective as a pool actually in operation for maintaining rates. The different parties do not know how much of the business they are going to get, but they know that whatever they get they will have to account for at full rates, and whatever others get will be accounted for to them at full rates and this takes away the motive for securing business by cutting rates. But this assumes that all parties feel reasonably sure that what they have agreed to will be done, and will continue to be done for some time. Now, there are so many slips 'twixt the cup and the lip in agreements which cannot be enforced by law, that, until the habit, as it were, of making and keeping them has been established, the parties to them are likely to be more or less fearful that they will not be carried out, and one will not see another take much more than its usual share of traffic without trying to get even with it. In the trunk line, after nine years of experience, there appears at last to be something like confidence that the agreement actually made will be executed; and when one gets a suspiciously large share of any given traffic, the others are not likely to "shade rates" to get even with it, but simply watch it sharply and see that they are duly paid for their "shortage" as the agreement provides, and pending a new apportionment, they act as if they were reasonably confident that the business will actually be divided in accordance with the decision which is yet to be made—though they also sometimes act as if they thought the decision might be affected by the share they secure while it is pending. But there has not been so much experience in dividing east-bound as west-bound traffic and there are many more parties to the west-bound division at points of shipments, as especially there are many whose interest is confined to one or two small places, and who consequently cannot exert much power, and fear that they may not receive fair treatment because they are not powerful. Therefore we can hardly count an agreement to pool at Peoria, Indianapolis, St. Louis, etc., as equivalent to a pool actually in operation, but will be more confident when the divisions have actually been made and balances settled in accordance with them.

The Chicago & Atlantic has agreed to pool its passenger business and become a member of the Passenger Department of the Central Traffic Association; but it remains outside of the freight combination. It is understood that it asked that it be allowed to have 94 per cent. of the Chicago freight shipments, which is what was allotted it in the old pool, and that its contract with the Wabash be taken care of by the co-operating roads—at least that its percentage be not diminished on that account. The other roads, some of them at least, were not willing that the Chicago & Atlantic should be exempt from arbitration, when

they had had to submit to it, and the probability is that the Chicago & Atlantic will remain outside, with the understanding that it will limit itself to the 94 per cent. of the traffic which is all that it claims, and that it will not renew its contract with the Wabash after it expires, next February. It is said to be maintaining rates now.

The Wabash, which a little while ago was thought to be most in the way of the maintenance of rates, has agreed to submit to arbitration its claim to a share of the Chicago traffic—not whether it shall have any of the traffic or not, but how much it shall have. Its contract, while it lasts, gives it the power to get some traffic, and it is not to be supposed that it will give it up because the other roads think the Chicago & Atlantic had no right to make the contract which gave the Wabash a Chicago line.

The condition of things in Chicago is thus made better than it has been. There and elsewhere in the West there has been a good deal of irregularity which was not confined to the Wabash and the Chicago & Atlantic. The cuts were doubtless not very deep; the high lake and canal rates show that pretty clearly; but when they begin there is no telling where they will end, or rather if the cutting lasts long it is sure to take the whole profit from the traffic.

The ten companies which have reported their July earnings so far all show gains, some of which are very large, as 20½ per cent. by the Buffalo, New York & Philadelphia, 44 by the Chicago & Atlantic (which has never reported before, and shows \$483 per mile of gross earnings), 20½ by the Eastern Illinois, 11½ by the Milwaukee, Lake Shore & Western, and 25 by the St. Louis & San Francisco. The July earnings of eight of these roads have been, for five years:

	1882.	1883.	1884.	1885.	1886.
Buff. R. & P.	\$63,486	\$109,945	\$106,909	\$114,312	
En. Iowa	\$96,249	107,874	97,212	89,693	99,044
Chic. & Alton	702,635	731,563	730,944	608,363	714,863
C. & E. Ill.	151,763	120,693	128,392	114,064	137,834
C. M. & St. P.	1,464,927	1,829,285	1,949,545	1,893,976	2,036,000
Long I.	256,701	379,511	366,852	373,079	391,661
M. L. S. & W.	73,156	88,239	96,808	112,818	238,716
St. L. & S. F.	330,914	270,101	350,111	326,078	407,818

It is noticeable that all but one of these roads earned less last year than the year before, and in the aggregate their earnings were:

	1883.	1884.	1885.	1886.
\$3,590,632	\$3,838,599	\$3,085,010	\$4,140,188	

so that while the gain over last year is \$455,178, or 12½ per cent., the gain over 1884 is only \$301,289, or 8 per cent. This latter, however, is a large gain. Nearly one half of it has been made by the Milwaukee, Lake Shore & Western, due largely to the extension of its line and its new ore traffic. The Rochester & Pittsburgh, the Milwaukee & St. Paul, the Long Island, the Milwaukee, Lake Shore & Western and the St. Louis & San Francisco all report larger earnings this year than ever before. Those of the Central Iowa were exceeded in 1883; the Chicago & Alton's in 1883 and 1884; the Eastern Illinois' in 1882. The Milwaukee & St. Paul has nearly as great earnings this year as those of the other several altogether. While its gain over last year is 7½ per cent., is over 1884 it is only 4½ per cent. Altogether, the showing for July is very favorable.

The Principle of the Injector.

The *Journal* of the Brotherhood of Locomotive Engineers, contains several answers to the question, "Why does an injector work?" The following contributions are specimens of tolerably correct and wholly erroneous solutions of a problem which for many years puzzled the engineering world:

"All injectors work mainly on the same principle. The resistance of pressure in boiler, weight of check valve and friction of pipes are overcome by the momentum imparted to the water by the steam at the point where the steam suction and discharge pipes combine. In order to attain the necessary velocity the water must come through the suction pipe cold enough to condense the steam immediately when they come in contact with each other, thereby giving the steam a solid body of water to act on, and allowing it to exert all its force in one direction. If the water be so hot as to not immediately condense the steam, then the steam would occupy space in the discharge pipe, and would naturally exert a pressure in both directions, thereby breaking the stream, and would force the water back through the suction pipe, even though the water is cold. If the quantity supplied is not sufficient to condense the steam the injector will not work."

Another contributor says:

"Now, as to my belief as to what makes the injector operate, I think in no way can I explain it better than by comparing it to a shot gun (now don't laugh, but read and see if it don't strike you that way; I mean the idea, not the gun), in which steam is the powder and water the shot. If we shoot a gun loaded simply with powder, the smoke of the discharge passes but a little way from the muzzle; but put in a few shot and they are propelled hundreds of feet; place a board near and they will go right through it. The secret of their penetrating force is their weight. "The force of the momentum of any body is in proportion to its weight." See? And that explains why the injector will not work hot water. The nearer to steam that water becomes, the lighter it is, until it is so light that it will not have weight enough to give it the force necessary to lift the check valve that it is fired against by the powder steam."

"It is the momentum of the water fired out of the nozzle of the steam jet that gives the penetrating power, and the more solid the water is, the more power it will have with the same velocity; the nearer steam the water is the less will

be its force, and consequently, the injector will not work hot water, or water much above 150°."

It need not be said that the reasoning of the second contributor is wholly erroneous. The fact that steam from a boiler will not only re-enter that boiler after passing through several pipes, contracted passages and valves, but will carry a considerable body of water with it, will always be an apparent paradox, and it is not surprising that locomotive engineers should be a little uncertain as to the exact explanation.

The action of an injector may, however, be easily explained. High-pressure steam moves with an immense velocity, steam of 140 lbs. pressure above the atmosphere being capable of flowing into the atmosphere at the rate of 1,917 ft. per second, or 1,302 miles per hour, which is sufficient to impart a moderate velocity to a body heavier than itself. In an injector, that body is the feed-water. Unless, however, the feed can condense the steam, the injector will not work. The reason is apparently purely mechanical, as the steam, being bulky and highly elastic, can have no appreciable effect in driving the particles of water in any given direction. When, however, the steam is condensed into an unelastic jet of water still moving at a great velocity, it forces the feed water before it into the boiler. This is easily illustrated by supposing that an attempt was made to propel a ship by a jet of compressed air from the stern. The air would simply rise in a mass of foam to the surface, and the energy in the air would be wasted in spray instead of propelling the ship. A jet of water, however, directed astern would have no tendency to rise, as there would be no difference of specific gravity, and it would therefore propel the ship by reacting against the mass of water.

It is somewhat singular that there has been so little theoretical discussion of the injector, accompanied by formulae giving the quantities of water of a given temperature which should be delivered per hour by an injector of a given size, working with a given pressure of steam. Some empirical formulae exist, based on the result of experiments, but such as are based on pure reasoning from the recognized laws of physics seem to be very little known.

Chicago, Burlington & Quincy Earnings in June.

There is an increase over last year of 8 per cent. in the gross and 22 per cent. in the net earnings of this road in June, in which month the earnings and expenses have been:

Year.	Miles.	Gross earn.	Expenses.	Net earn.
1880.....	2,597	\$1,682,956	\$834,283	\$848,673
1881.....	2,712	2,083,862	962,788	1,121,074
1882.....	3,168	1,437,604	921,541	516,063
1883.....	3,231	1,937,916	983,228	954,688
1884.....	3,373	2,077,182	1,064,441	1,012,741
1885.....	3,516	1,992,484	1,224,198	768,286
1886.....	3,646	2,148,532	1,209,456	939,076

The gross earnings were thus larger this year than ever before, though only 3 per cent. more than in 1881, though the mileage has increased 4.3 per cent. The net earnings, however, were less than in 1881, 1883 and 1884.

For the half-year ending with June the earnings and expenses have been:

Year.	Gross earn.	Expenses.	Net earn.
1880.....	\$9,659,605	\$4,647,581	\$5,012,024
1881.....	9,098,547	4,940,603	4,157,944
1882.....	9,156,115	5,264,603	3,891,512
1883.....	11,465,203	6,023,656	5,381,547
1884.....	11,616,022	6,457,052	5,158,970
1885.....	12,372,967	7,217,320	5,155,647
1886.....	11,523,358	6,679,225	4,844,133

Compared with last year, the decreases are:

Amount.	Gross earn.	Expenses.	Net earn.
Per cent.....	\$849,600	\$538,005	\$311,514
	6.8	7.5	6.0

The decrease in net earnings for the half-year is equal to about 40 cents per share of stock, and for a company with so large a surplus as the Burlington has had for years is a trifle. Indeed, the gain in June was considerably more than half the decrease for the half-year. This company's lines are south of the territory where the drought has been most severe, but its territory has suffered somewhat.

Railroads in Switzerland.

The Swiss Department of Railroads has recently published the national railroad statistics for 1884.

There were 1,790 miles of railroad in Switzerland at the close of the year, including 59 miles of cog wheel, cable or other mountain railroads, less than four miles having been added during the year. They had cost \$210,029,600, including \$3,596,382 for the special mountain roads. The ordinary railroads had cost \$119,327 per mile, and the mountain roads \$61,000 per mile. On the 1,790 miles there were 189 tunnels, 1,963 bridges and 656 stations—one station for every 2.73 miles of road. The length of double track was 178 miles. Of the ordinary railroads 25.9 per cent. was level, and of the mountain roads only 8.8 per cent.

The system was worked with 619 locomotives, 1,807 passenger cars, with seats for 80,245 persons (44½ per car), and 9,031 freight cars with capacity for 102,322 tons (= 11½ tons per car).

The number of locomotive-miles was 10,802,290, averaging 17,420 per locomotive; and the number of train-miles was 9,122,470, which is equivalent to very nearly seven trains each way daily over the entire mileage; 23,488,640 passengers were carried an aggregate distance of 323,836,170 miles, the average journey being 13.8 miles, and the whole movement equal to 181 passengers each way daily over the whole mileage. The average passenger fare was 3.66 cents per mile on the ordinary railroads, and 3.875 cents on the mountain roads, which is very high for Europe, and is the more noticeable because only 1½ per cent. of the

passengers travelled first class, and 82½ per cent. were third class.

There were 8,021,373 tons of freight carried an average distance of 35.77 miles, making 286,924,112 ton-miles, which is equal to a movement of 229 tons each way daily over the whole system. The average rate for freight, including baggage and live stock, was 2.665 cents per ton per mile. The passenger traffic yielded \$2,985 and the freight traffic \$4,435 per mile of ordinary railroad, the mountain roads earning \$2,795 per mile from passengers and \$860 from freight. The average freight rate on the latter was 16.13 cents per ton per mile. Other earnings were \$404 on the ordinary and \$313 on the mountain roads, making a total of \$3,768 on the mountain railroads and \$7,826 on the other roads, against \$6,663 on our railroads in 1884 and \$7,461 in 1883.

The cost of working the Swiss railroads was \$4,189 per mile; of the mountain roads, \$2,640; so that the net earnings were \$1,128 for the mountain lines and \$3,635 for the other railroads, which latter may be compared with the \$2,143 of the railroads of the United States the same year.

The cost of the Swiss railroads has been so great, however, that their net earnings were but 2.86 per cent. on their capital, while ours earned net 3.49 per cent. on their whole stock and debt.

The heaviest passenger traffic in Switzerland was on the Bodeli Railroad, where it was equal to 225 each way daily, while on another it was only 35½; the heaviest freight traffic was only equal to 103 tons each way daily, while the lightest was only 8 tons. The little Rigi Railroad (mountain), earned \$14,680 per mile from passengers, receiving 21½ cents per passenger per mile. The total earnings of the Rigi were \$16,114 per mile, while the highest on any ordinary railroad were \$11,995. One ordinary railroad collected the extraordinary average freight rate of 11 cents per ton per mile, the Rigi getting \$1.05 per mile for taking a ton up or down the mountain. The cost of working the Rigi was \$10,800 per mile, leaving \$5,314 net.

The four Swiss cable railroads, 0.1 mile, 0.2 mile, 0.37 mile, and 1.12 mile long respectively, were all worked for about 45 per cent. of their gross earnings, but the returns on the capital varied from 1.42 to 17.25 per cent.; the latter, with the shortest road (only 530 feet long), which cost but \$15,054, has but two cars, is worked by a force of six men, and gets about 5 cents apiece for carrying a passenger up or down. The longest of these roads, which runs 95 trains a day, and carries an average of 1,328 passengers daily (Lausanne to Ouchy), made a profit of \$13,364, but it cost \$680,503.

Switzerland produces comparatively little freight from the nature of the country, and many of its railroads are costly to work. It has a population of 1,590 per mile of railroad, which is nearly 3¼ times as much as there is here, and it has every year a great rush of travel by foreign tourists which is very important to some of the lines.

Lake and canal rates have been unusually high for the season, though it cannot be said that the grain movement has been large. It has been larger than last year or the year before, however, and the larger ore shipments have given more employment to lake vessels. For some time rates from Chicago to Buffalo have been 2½ cents a bushel for corn and 3 cents for wheat; and from Buffalo to New York 4½ and 5 cents. The lake shipments compare as follows with those of the three years previous:

	1883.	1884.	1885.	1886.
4 weeks to May 29.....	11,510,685	7,264,868	13,335,970	13,206,177
June 26.....	11,190,730	8,560,287	7,880,742	9,244,219
July 24.....	8,484,619	8,240,990	7,242,719	9,536,692
12 weeks.....	31,186,034	24,086,145	28,459,431	31,987,088

Thus the movement by lake this year has been but 12½ per cent. more than last year and nearly the same as in 1883, while it was very much less than in 1881, when for the 12 weeks it was 42,941,066, and also less than in 1880.

It can hardly be the increase in shipments that has put up the lake rates so much; and, in fact, it is not. The rates have gone up chiefly because the lake vessels do not have to compete with the excessively low rail rates of the last two years. They do not carry much more grain than last year, but they get nearly twice as much for carrying it.

The rail shipments, naturally, have been very much less this year than last or the year before, having been for the 12 weeks:

	1882.	1883.	1884.	1885.	1886.
12 weeks.....	13,222,583	16,582,304	25,497,845	26,069,027	17,585,071

The shipments this year were thus nearly one-third less than last year or the year before, yet in excess of those of other years when rates were maintained. In 1881 the rail shipments for the corresponding 12 weeks were 23,855,000 bushels, but more than half of them were made in the last five of the weeks, which were the first of the great railroad war of that year. At the rate the rail shipments were made until the cut to 15 cents June 18, the rail shipments for the 12 weeks would have been 19,360,524 bushels for the 12 weeks.

Since the canal opened the shipments from Buffalo by canal have been just about twice as great as the rail shipments from that place; while last year down to the same date, in spite of the low rail rates, the canal shipments were three times as great as the rail shipments, the total (from Buffalo) being much less than this year. The averages per week were, from the opening of canal navigation to July 24:

	By rail.	By canal.	Total.
1886.....	663,899	1,342,367	2,006,266
1885.....	368,900	1,121,375	1,490,275

Of the increase of 515,931 bushels per week over last year, the railroads have 294,989 bushels and the canal 220,942.

The explanation probably is that the canal boats have had all they could conveniently carry this year, and the balance of the shipments were forced to go by rail. We may be sure that canal rates would not be so high if the boats needed cargoes.

We have several times noticed that this year the shipments of flour from the Northwestern markets have been made by lake to an extent unknown before for many years. This lake movement continues, and in every week since April more than half the reported shipments from the Northwestern markets have gone by lake. For the 11 weeks ending July 24 the flour shipments have been, this year and last, in barrels:

	1885.	1886.	Inc. or Dec.	P. c.
By rail.....	827,515	1,197,392	-369,877	30.8
Down Miss.....	111,195	108,558	-2,637	2.4
By lake.....	1,256,175	535,999	+722,176	134.7
Total.....	2,194,885	1,841,949	+352,936	19.3

The higher rail rates this year have favored lake shipments, but they are much larger than in any year when rail rates were as high as this year, when 57½ per cent. of the total shipments went by lake, against 29½ per cent. last year.

The receipts of grain at Northwestern markets during the week ending July 24 were 6,949,492 bushels, which is not only much more than in any previous week of this year, but was exceeded in only two weeks of last year (the last two of September, when the spring wheat movement was at its maximum). In 1884, however, these receipts were very often exceeded after harvest, though not until after the first week in August. Then for 11 successive weeks the receipts exceeded 7,000,000 bushels and in six of them exceeded 8,000,000. It is not impossible that we may have something like that heavy movement again this year, notwithstanding the light crop of spring wheat.

The Northwestern wheat receipts continue to increase, and wholly at the winter wheat markets. The feature of the week to July 24 is the very large receipts at Toledo, 1,169,169 bushels, and the 522,506 bushels received at Detroit, with which the practice of "short billing" may have had something to do, as Western roads, in their competition with each other, unable to cut the through rate because of the refusal of the Eastern trunk lines to accept shipments at cut rates, have made less than the *pro rata* rate to various junction points. The receipts at St. Louis have increased also, however, and those at Chicago, and St. Louis leads as before, with receipts among the largest it has ever had.

The total wheat receipts of the Northwestern markets for five successive weeks have been, in bushels:

	Week ending—	July 10.	July 17.	July 24.
June 26.	684,646	699,832	1,303,303	2,389,742
July 3.				3,967,079

The largest wheat receipts in any previous week of this year were 1,096,000 bushels; the largest last year, 2,633,518 (in October); the largest in 1884, after an exceptionally large crop, 4,062,176. Thus, the receipts for next to the last week of July this year were very nearly as great as the greatest in the most productive year. Since July, 1884, at least St. Louis and Toledo have not had so large wheat receipts. St. Louis' largest in 1884 were 973,421 bushels; in 1885, 638,969, against 1,263,489 and 1,371,746 bushels in the last two weeks reported; and Toledo's receipts two weeks ago were also the largest since 1883, and more than twice as great as in any week of last year, and more than for the entire 27 weeks of this year to July 10.

There have been numberless telegrams about the condition of crops, most of them unfavorable, but on the whole spring wheat seems to be turning out fully as well as was indicated three weeks ago. The crop in the upper half of the Red River Valley and in the same latitude further west is very light; further south, on the line of the Northern Pacific it is better, though light. In Central Dakota again it is very light, and in parts of Minnesota, but apparently Minnesota altogether will have a yield about a fifth less than its average, which has not been large for a number of years. In much of Wisconsin the crop is very light, and it is by no means good in Iowa. Harvesting is beginning in North Dakota, being earlier than usual.

The greatest apprehensions recently have been for the corn crop, which, west of Indiana, was suffering from drought. Rains have been reported nearly every day for two weeks, but they were nearly all local rains, until near the end of last week there were some covering a large territory. There has doubtless been some damage to corn by drought, apparently mostly in Iowa, which is now the great corn state; but it is impossible to say how much harm has been done, as there have been showers in many places, and there is yet time for rain to do good. The corn will be early, and so not likely to suffer from frost, and though there cannot be as large a yield as the largest, yet in view of the 3½ per cent. larger acreage than last year, the general fair condition in the South and east of Illinois, it is quite possible that the crop may be nearly as great as last year and larger than ever before.

The prospects for the cotton crop have improved since the June report. West of the Mississippi it will apparently be large, and in the other Gulf states fair, but in the Atlantic states lighter than last year.

The extension of the Minnesota & Northwestern Railroad from Freeport to Chicago appears to be made under the auspices of the Illinois Central, and though it does not yet appear that the Illinois Central has assumed any financial obligations in connection with it, it is probable that the contract between the two companies provides for such a conduct

of the traffic as will make the two virtually one line between Chicago and St. Paul.

It long ago seemed strange that the Illinois Central should leave the Dubuque arm of the enormous Y which its Illinois system formed unconnected at the head with the Chicago arm, Chicago being the market for nearly all the produce on the northern 150 miles of the Dubuque arm as well as on the whole 402 miles of the leased Iowa lines. Several railroad building periods have passed in which it might easily have secured the seemingly desirable line of its own from Dubuque to Chicago, with a pretty fair territory for local traffic; and twice there have been bankrupt roads which might have been picked up (though not without competition). The Chicago & Pacific seemed just fitted to the hands of the Illinois Central; but it seemed not to pay the slightest attention to it when it was in the market; and the Chicago & Iowa, which had been and has been since the Chicago outlet for its traffic, apparently did not tempt it; though perhaps it thought best not to bid against the Chicago, Burlington & Quincy. This apparent indisposition to secure a line from Chicago to Dubuque made it seem probable that it would not renew the leases of its Iowa lines, which expire next year, and have not been profitable, and become almost solely a north-and-south road.

Suddenly the Minnesota & Northwestern is built from St. Paul to Dubuque, and now is being extended from Freeport to Chicago, giving the Illinois Central a pretty direct line from Chicago to St. Paul, and increasing the inducement to renew the leases of the Iowa lines; that is, if the Illinois Central shall own or lease the new line from Chicago to Freeport, so as to have an interest in making its net earnings as large as possible. At present the traffic of the Iowa leased lines to and from Chicago passes over the Illinois Central only between Dubuque and Forrester, 81 miles, the Chicago & Iowa and the Chicago, Burlington & Quincy hauling it the other 119 miles (the freight at a fixed sum per car). If the Illinois Central got all the profit on the haul all the way between Dubuque and Chicago, the traffic from these lines would be more valuable to it than it is now. Without a Chicago line of its own, the Iowa lines would be worth more to the Chicago & Northwestern, the Milwaukee & St. Paul or the Chicago, Burlington & Quincy (from its new Chicago, Burlington & Northern line) than to the Illinois Central, and they could therefore afford to outbid it. Indeed these Iowa leased lines of the Illinois Central are so near lines of the Milwaukee & St. Paul in Iowa that they ought to be worth more to it than to the Central in any event.

The Illinois Central management has always been conservative, and the great Dutch and English holdings of its shares have probably made the managers here more so than they desired sometimes. The acquisition of the Southern Division apparently was regarded as a mistake abroad for a number of years, until it proved to be enormously valuable.

Of the new line from Chicago to Freeport and from Dubuque to St. Paul, it may be said that its chances would have been very much better if it had been built several years sooner. It is uncomfortably near other railroads. In Illinois there will be one within six or seven miles on either side nearly all the way, and there will probably not be as much as six square miles per mile of road nearer to it than to any other railroad. In Iowa it is not quite so closely elbowed, and in Minnesota still less so.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines is given in the current number of the *Railroad Gazette* as follows:

Atchison, Topeka & Santa Fe.—A branch is completed from Mulvane, Kan., west to Clearwater, 15 miles.

Chicago, Burlington & Northern.—An addition of 14 miles at various points is reported.

Chicago, Burlington & Quincy.—This company's Burlington & Missouri River Line has been extended from Grand Island, Neb., west to Ravenna, 31 miles. The Holdrege Line is extended from Elwood, Neb., west to Farnam, 22 miles.

Dubuque & Northwestern.—Extended southeast to Elma, Ia., 21 miles.

Florida Midland.—Track laid from Apoka, Fla., east 6 miles.

Gulf, Colorado & Santa Fe.—The Dallas Branch is extended from Dallas, Tex., northeast 24 miles.

Long Beach.—Extended southeast to Barnegat City, N. J., 8 miles.

Milwaukee, Dexterville & Northern.—Track is laid from Dexterville, Wis., northwest to Cary, 12 miles.

Missouri Pacific.—The new loop line of the Missouri, Kansas & Texas Division is extended from Minden, Mo., southwest to Chetopa, Kan., 31½ miles. On the Lincoln Branch track is laid from Weeping Water, Neb., west 30 miles.

New York Central & Hudson River.—The Genesee Falls Branch in Rochester, N. Y., is completed, 1 mile.

St. Louis, Fort Scott & Wichita.—The Wichita & Colorado Division is extended from Haven, Kan., west to Elmer, 9 miles.

Savannah Valley.—Extended northwest to Stony Point, S. C., 45 miles.

Toledo, Ann Arbor & North Michigan.—The Northern Division is extended from St. Louis, Mich., north to Mt. Pleasant, 21 miles.

Verdigris Valley, Independence & Western.—Completed from Leroy, Kan., west to Yates Centre, 16½ miles.

This is a total of 307 miles on 13 lines, making in all 2,262 miles thus far reported for the current year. The new track reported to the corresponding date for 15 years has been:

Miles.	Miles.	Miles.	Miles.
1886.....2,262	1881.....3,115	1876.....1,145	
1885.....1,305	1880.....2,631	1875.....594	
1884.....1,859	1879.....1,273	1874.....913	
1883.....2,796	1878.....947	1873.....1,066	
1882.....5,967	1877.....845	1872.....3,372	

This statement covers main track only, second or other additional tracks and sidings not being counted.

NEW PUBLICATIONS.

The *Popular Science Monthly* for August contains an interesting article on "Woods and their Destructive Fungi," by Mr. P. H. Dudley, C. E. Mr. Dudley gives a fully illustrated account of the fungi which attack ties and other timber and of the resulting weakness and decay, and suggests some measures for the prevention of the injury which they frequently cause.

A German Railroad Collision.

July 1 last there was a remarkable butting collision on one of the Prussian state railroads, between the stations of Wurzburg and Rottendorf. The Stuttgart lightning express leaves the Wurzburg station for Rottendorf at 1:20 p. m. daily, while about the same time a mail train from Bamberg is due at Rottendorf. There are two lines between Wurzburg and Rottendorf, one belonging to the Nuremberg and one to the Bamberg Railroad. It had been usual in case the Bamberg train was behind time to dispatch the express over the Bamberg track. July 1 the mail train was late, and the express was dispatched as usual, but in some inconceivable way—so written an eye-witness in the *Journal* of the German Railroad Union—it is said through an error in telegraphing—the mail train was dispatched over the same track, and this—which is so inconceivable—without any of the trainmen noticing it. About two miles from Wurzburg the road crosses the Faulenberg by a very sharp curve. On this account it was impossible for the engine-men to see the train approaching them in time; but the engine-man of the express, which was ascending a grade, was able to bring it nearly to a stop before the collision, while the mail, which was going down hill, could not be checked.

"What occurred then defies description. With a crash like a thunder clap, but much louder, the two trains came together. Some idea of the violence of the collision may be formed when it is known that the two engines made a single snarl of ruins. Naturally, the mail train fared worst. The tender with the baggage car shot up into the air, turned over, and fell upon the engine, with the wheels on top. The two first cars were literally reduced to splinters. The front compartment of the fourth car was broken in, and the other cars more or less damaged and thrown from the track. The express got off better. Its tender was slung to one side and overturned, the mail and baggage cars were half shattered and thrown to one side, while the other cars only had their couplings broken and were derailed. The sight which offered itself to the survivors was indescribable and unforgettable. The chaos of ruins, the cries of children for their parents and of parents for their children, the horribly mutilated corpses, the frightful wounds of the injured—all contributed to make the picture a terrible one and to cause the greatest anxiety and confusion. The engine-man of the mail train had his head and abdomen cut entirely in two; the engine-man of the express escaped with slighter injuries, having been protected by the coal box. The firemen likewise received only slight injuries, having saved themselves by jumping in time. The brakemen were more or less injured. A mail inspector had an arm and two ribs broken and wounds on his head. Nearly all the passengers in the first three cars of the mail train were injured, but most of those in the express escaped with nothing worse than fright. The conductor of the mail car in the express escaped by jumping, but was insane from fright for some time. Twelve persons were killed on the spot, and three of the injured died after removal to a hospital, and 37 more were injured, most of them in the feet and the abdomen."

The management of the division of the State railroads on which this accident occurred, five days later issued an explanation which says that the line at that place is not a double-track road, but two roads, worked as single-track roads; one being used for the trains of the other only in case of delay to a train. In such case the Wurzburg station notifies the Rottendorf station by telegraph on which track each of the two trains must pass, whereupon the Rottendorf station repeats the telegram to make sure that it has been accurately received. The proper employees at the two stations then notify the switchmen by a written order what line they are to open for the approaching train; further, the head conductors of the two trains are informed by a plain statement on the bulletin board and the engine-men by a similar written order, which is communicated to the train guards by the conductors. Finally, every train which passes over the road to which it does not regularly belong has to carry a red signal on the front of the engine, which gives notice to the road watchmen that it has a right to the "false" track, as it is called.

These regulations had been in force for a long series of years without accident, and were fulfilled in the case of the trains which met with the accident, except that there was delay in communicating the written order to the switchmen at Wurzburg.

"From some cause, so far unexplained, the signal 'line clear to Bamberg' after the express had been started and before it had reached the signal mast was withdrawn by the signal man and replaced by the signal 'line clear to Nuremberg.' This led the switchman (who claims that he had not yet received his written order) to let the express into the Nuremberg instead of the Bamberg road; and on this the trainmen, in spite of the positive orders to the direct contrary which they had received, continued to run the train. Nor did the road watchmen signal the express to stop, though they had been notified by the bell signals along the track that the mail was coming from the opposite direction, and although the express engine did not carry the signal showing that it had the right of the road."

A criminal and administrative investigation of the accident was in progress when the above was written.

TECHNICAL.

Locomotive Building.

The Rhode Island Locomotive Works in Providence have recently delivered 3 heavy passenger engines to the Central Vermont road.

The Pittsburgh Locomotive Works in Pittsburgh have recently received several orders for locomotives, and the shops are now well employed.

The Boston & Albany shops in Springfield, Mass., are building a freight engine with 20 by 26 in. cylinders for the road.

The Car Shops.

The Ensign Manufacturing Co. in Huntington, W. Va., last week delivered 40 freight cars to the Annapolis & Baltimore Short Line road. The company has now on hand orders sufficient to keep the shops running for six months.

The Wason Manufacturing Co. at Brightwood (Springfield),

Mass., has just completed 6 handsome passenger cars for the Boston & Providence road.

Iron and Steel.

Oliver Brothers & Phillips in Pittsburgh are filling a heavy order for bolts for the Union Pacific Railroad.

The Thomas Iron Co. has put its Keystone furnace out of blast for repairs. The company has just declared its usual semi-annual dividend of 4 per cent.

The Bethlehem Iron Co. at Bethlehem, Pa., has put its rolling mill on full double turn, owing to a pressure of orders.

Vesuvius Furnace at Ironton, O., has gone into blast after a long stoppage.

The Colorado Coal & Iron Co. will shortly start up its blast furnace at Bessemer, Colo., and it is said that the rolling mill will also be put in operation in a short time.

The Linden Steel Works in Pittsburgh are filling an order for 600 tons of steel plate and girders to be used in the construction of Mr. Vanderbilt's new steam yacht.

Manufacturing and Business.

The Kalamazoo Railroad Velocipede Co. has recently shipped 100 of its improved steel velocipedes, adapted for 5 ft. 3 in. gauge, to Australia. The order came from the Government railroad administration and was sent after a thorough test of one of the company's cars in service. The company is also shipping a number of velocipedes and hand cars to South America.

The Wainwright Manufacturing Co., of Boston, notes the sale during July of its feed water heaters, running up to 150 horse-power, to parties in Boston, Cambridgeport and Northampton, Mass., New York, Philadelphia and Kansas City. The company also reports sales of corrugated tube expansion joints to the Benedict & Burnham Manufacturing Co., at Waterbury, Conn., of largest sized filters to John R. Miller & Co., of Reading, Pa., and has made large sales of patent corrugated brass tube radiators at different points.

The Rail Market.

Steel Rails.—There is very little change to report. Quotations continuing steady at \$34@35 per ton at Eastern mills. Orders continue to come in and the mills are all busy.

Rail Fastenings.—Prices continue nominally unchanged at 2.40 cents per lb. for spikes in Pittsburgh; 2.75@3.10 for track-bolts, and 1.65@1.80 for splicebars. A fair demand is reported, with several large orders on the market.

Old Rails.—The demand for old iron rails continues less than the supply, and quotations are unchanged at \$18.50@19.50 per ton at tidewater. Old steel rails are quoted at \$20@22 per ton in Pittsburgh, with only a light demand.

The Frost Light for Cars.

The Northern Pacific Co. has fitted up one of its passenger cars with the Frost gas light and this car is to be run on the road for a time, giving the light an extended test in actual service. Should these tests be satisfactory the company will adopt the Frost light for all its passenger equipment.

Railroads in Peru.

Mr. W. H. Gilley and a large staff of engineers are now on their way from New York to Peru to begin extending the Lima & Oroya Railroad from the present terminus to the silver mines at Cerro de Pasco. The work is to be done under the contract made by Grace Brothers with the Peruvian government last year. The road from Lima to the present terminus was built under the old Meigs contract.

A Parlor-Observation Car.

A new and elegant car, called "Ymir," belonging to the Monarch Sleeping Car Co., has been built to run during the season between New York and the White Mountains, over the Connecticut River Line. An attempt has been made to construct a car which shall not only be cool, but shall look cool. To this end, in place of a single roof, which must necessarily become soon heated by the rays of the sun, the roof has been constructed double, having an air space extending from end to end, through which, when the car is in motion, there is a constant circulation of air. Connected with this air duct are suction ventilators in the ceiling of the car, which exhaust the foul air and discharge it at the rear. To furnish a supply of fresh air to the car, pipes are placed in the sides between the windows connected with the hood on top, and having ventilator openings which can be opened and closed at will. Fresh air in large quantities is thus brought into the car, and when it becomes vitiated it is carried out through the ventilators in the top, while, by a peculiar construction of the tubes, the cinders and dust are discharged outside underneath the car. As the car is built for a parlor and observation car, it differs in construction from an ordinary drawing-room car. The total length is 66 ft. The two ends for the first 16 ft. are constructed almost entirely of glass, with round corners, and are built the ordinary width of 9 ft. 10 in. The closets, buffet and three state-rooms, are placed in the centre and are only 5½ ft. in width. As the floor of the car is of the same width throughout, an aisle 26 in. wide extends from one observation room to the other on either side of the car, protected by the roof, which also serves as an awning to the state-rooms. Large, easy, movable arm-chairs, covered with dark blue leather, form the seats in the observation and state-rooms, each observation room being provided with eight and each state-room with four, giving a total seating capacity to the car of 28. In order to give the car an appearance of coolness, the floors are laid with tile, and the decoration inside is blue and gold and silver. The decoration on the windows represent icicles, and this idea is also carried out in the glass-ware. The outside painting is brown and silver, representing the car covered with snow and ice. By the peculiar construction of the ends, which are wider than the centre, passengers sitting in the observation rooms have an unobstructed view in both directions, and those who are fortunate enough to secure state-rooms can look out as readily from one side of the car as the other. The state-rooms are entered from doors on the sides, which, as they are not flush with the sides of the car, can be left open, even when the car is in motion, or passengers may even venture to sit in the doorway or in the aisle without fear of dust, smoke or cinders. The luxury, comfort and convenience of this arrangement when the car is stopping at stations is readily seen, as no one is discommoded by passengers moving about. A large, well-stocked buffet is located next the observation room, from which hot meals will be served.—*Official Guide.*

Putting the Electric Wires Underground.

The Electrical Subway Commission in New York has adopted specifications for the construction of the conduits or subways to be laid in the streets of that city to receive the wires. The specifications provide that the conduits shall be rectangular in section, containing ducts varying in number, each 2½ in. in diameter. The conduits will rest on a continuous foundation of Portland cement concrete not less than 6 in. in thickness. Manholes or working vaults will be built at street crossings. House distribution of conductors will be made from these manholes by means of small lateral conduits or branches. The strength of the material is to conform to a report of the Commission on the subject adopted on June 30. The contracting company must furnish specimens of its

material to the Commissioners, who will have power to recommend or condemn it. The decision of the Commission on this and on all other points is to be final. The contracting company is subject to very stringent rules regarding the digging of the trenches, and is restricted to the excavation of not more than 200 ft. of trench at one time, unless the permission of the engineer is obtained to open a greater length. On the completion of 1,000 ft. of conduit the pavement shall be replaced. The company is charged with the care of the sewers and other underground pipes pending the excavation, and safeguards against the danger from blasting are provided.

When sectional conduits are used the ends of the same must be so dressed at the factory as to allow for making an air-tight joint. The sections must be laid so that the ducts shall be continuous, and the conduits when laid are to be subjected to such tests as the commission may direct. The brick and mortar to be used must be of the best quality. The foundations of the manholes are to be of stone masonry, and cast iron manhole heads and covers are to be provided. Each section of sectional conduits is to be not less than 3½ ft. long, exclusive of the hub.

Electric or Cable Railroads in Boston.

President Richards and the directors of the Metropolitan Railroad Co. have for some time been considering the question of introducing other motive power than horses for the propulsion of the cars of that road; and, at the regular meeting of the board yesterday, it was decided to introduce either electricity or cables. President Richards appointed a committee to thoroughly investigate the relative merits of both systems; and whichever proves, in the opinion of the directors, to be the most reliable and best in all respects, will be adopted. As is well known, there are many objections to the cable system, and many people look upon electricity as the coming power for street railways, and eventually for all railroads; and cables are regarded as merely temporary expedients to be used until electricity reaches a higher state of development. But there are a number of electrical railroads already in operation in different parts of the world, and some of them are claimed to be successful in every particular. The committee above referred to will visit New York, Chicago, Philadelphia and other places, and study the practical workings of both the cable and the electrical systems. The system that the committee recommends will, undoubtedly, be adopted by the directors for use on the long lines of the Metropolitan, and eventually all the lines will be run by the same system. Under the act of the Legislature authorizing consolidation of the street railways of this city the use of cable power is authorized, but nothing is said about electricity. Should the Metropolitan decide that the latter power is preferable, there would necessarily have to be further legislation, but it is believed the needed legislation could be secured without opposition next winter, and that would probably be as soon as the "plant" could be introduced.—*Boston Advertiser*, Aug. 4.

THE SCRAP HEAP.

Evil Effect of the Hot Weather.

"Well, I didn't think much of last week's *Gazette*. That report of the Burlington Brake Tests was remarkably 'Poor'."

Pathfinders.

"Isn't the ticket system itself," asked the fat passenger, "a proof that the company can't trust the conductor?" "Not a bit of it," replied the conductor; "it's a proof that the conductor hasn't trusted the passengers. Tickets, please!"

"Didn't make anything by your strike, Jemmy?" asked the fireman. "Didn't we?" replied the section man; "we brought the company to our terms." "Thought you went back on the old time, ten hours a day?" "Ah, yes; but look here; we struck for eight hours; stayed out seventy days and didn't do a lick of work, not a lick. Now we go back on ten hours, and that just about brings the year's work down to eight hours a day. Tell ye, old man, they was some brains managin' our strike."

"Say," exclaimed the member of the Legislature, handing up his pasteboard, "last year I traveled on a director's pass, and this year they've given me an employee's trip ticket. How is that?" "Oh, that's all right," said the conductor, soothingly. "You see, last year you managed things for the railroad; that made you a director; but this year the railroad is going to boss the Legislature, and so you see—going right through to Albany?"

"See here," said the train-boy, "does this company pay you for —?" "Never mind what the company pays me for," said the brakeman. "Do you suppose I am going to let as pretty a girl as that fall out of the window, when by working overtime a little I can sit down and hold her in?" "She is pretty," said the train-boy, wistfully, "and she ought to have a handsomer man to do her hugging. Couldn't you set up the oranges for her, or buy her an ivory bracelet?" The brakeman turned blue with rage. "If you haven't got the gall," he cried, "do you think I'd do such a thing as that? Why, you don't know that girl. She wouldn't tolerate such familiarity a minute. Why, I've only been acquainted with her a quarter of an hour! Shaker next! Shaker!"—*Burdette, in Pathfinder Guide or August*.

A Narrow Escape.

On Tuesday of last week, a passenger train on the Olean, Bradford & Warren—the narrow-gauge road running between Olean, N. Y., and Bradford—had one of the narrowest escapes from being blown into eternity ever recorded. When about five miles from Bradford, and while rounding a sharp curve, Engineer Tyler suddenly came upon a man who was driving across the track with a wagon load of nitroglycerine. The lever was reversed, but this seemed to have no effect in stopping the train, and the wagon just cleared the track as the locomotive reached it. Engineer Tyler was the only one who knew the terrible contents of that wagon until Bradford was reached, when he told a friend who was in the locomotive cab with him on the trip. The terrific force of the explosion which would have ensued had the locomotive struck the wagon cannot be estimated. None of the passengers were told of the terrible calamity they so narrowly missed.

She Stopped the Train.

Among the passengers on an up-town elevated road train on the Third Avenue line yesterday morning was a lady who had with her a bright little girl of 5 or 6 summers. The little miss was evidently bound on her first shopping tour, and was asking eager questions and trying to look from the car in all directions at the same time. When the train stopped at Twenty-third street she took her mother's hand and almost ran down the aisle, so anxious was she to get to the street and so fearful of being left. She was just bounding from the car to the platform when the lady discovered that she had left her parasol in her seat. Hurriedly she pulled the little girl onto the car and rushed back to recover her forgotten parasol and then back to the gate.

She was too late. The signal for starting had been passed along, the gate was slammed in the faces of the two, and the train was already slowly moving. The lady spoke earnestly to the guard, but to no avail. His face assumed that hard and flintlike expression which is never seen except on the face of an elevated train guard. Those of the passengers who had had a gate slammed in their own faces fully two minutes before a train started, and had been kept from gaining their liberty until the next station was reached, thought that the couple might as well resume their seats. But this guard had a soft spot in his heart for children.

The little girl looked up into his face and lisped: "Oh! please, mister, do let us get off—oh, dear, oh, dear, please do, mister."

And he did. He pulled the bell-rope, the train came to a stop, and the little girl proudly preceded her mother to the platform, saying, "I stopped the train, didn't I, mamma?"—*New York Times*.

Poetry and Prose.

"Try not the pass," the old man said, but the old man wasn't a legislator.

Passes for Life.

The Camden & Amboy wanted a little strip of water front between Kinkora and Bordentown. It was owned by an old gentleman named Field, who was keen-sighted, and he saw the great future of railroads. His strip of land at that time was worthless to him and only worth a couple of hundred dollars, at least, to any one except the railroad company. The road offered him a good price for the land and wanted to buy it the worst way, but Field refused to sell it except for one price—that was a pass for every member of his family as long as they lived. His terms were finally accepted and the passes were issued and have been ever since, although he has been dead for many years, and his children are now well advanced in years.—*Burlington (N. J.) Enterprise*.

Funny Railroading.

Captain Wood's gravity train from Bath to Hammondsport early each morning on arrival of trains from the east, is making fun for the people, but is a success. He can advertise on this train what no other road can—no cinders, no dust, an unobstructed view ahead of the train. The alarm for crossings consists of blasts on a dinner horn. The run is swiftly made, and the morning boat down Lake Keuka is caught at Hammondsport at 8:30 o'clock. The train has been full nearly every day.—*Elmira (N. Y.) Advertiser*.

Asking the Co-operation of Employees.

General Manager F. N. Finney, of the Wisconsin Central, has issued the following circular to the employees of the road, on the occasion of the opening of the new line to Chicago:

"Through fidelity to duty, politeness to all doing business with us, and by personally interesting ourselves in behalf of our patrons, the Wisconsin Central line has gained an enviable reputation. In opening the line to Chicago we shall have many new relations, many who will come to see if all they have heard is true, and so I address you, asking that the same care and diligence that has heretofore characterized your actions shall be enlarged and increased, and that every pains shall be taken to still further add to our popularity, remembering always that eternal vigilance is the price of safety as well as liberty, and furthermore, that we are all dependent upon the public, who look for prompt service, safe transportation, and obliging representatives. Let us see if we can't make the Wisconsin Central the popular line in the Northwest."

Train Wreckers on Trial.

The preliminary examination of the five men recently arrested under charge of wrecking a Missouri Pacific freight train last April at Wyandotte, Kan., when several men were killed, was begun at Wyandotte, July 29. One of the men has turned state's evidence and testified fully as to the guilt of defendants. They were all held for trial.

Railroad Young Men's Christian Association.

The Detroit Branch of the Association reports the addition of a number of members. The branch is now in good working condition, its chief need additional books for its library. The Association is somewhat ambitious, and hopes hereafter to secure a permanent building in Detroit for its use. This branch has two sub-branches; the first one, at Ionia, Mich., reporting an increasing membership, with a total attendance at its rooms of 3,562 persons during the quarter ending June 30. The second sub-branch, at the Brush street station in Detroit, reports a total attendance of 1,041 persons for the quarter.

The Springfield (Mass.) Branch reports an attendance of 2,862 for the month of July in the reading, washing and amusements-rooms; 267 baths were taken, 273 papers filed, and 75 papers distributed to the men. The Secretary has made 48 visits to the shops and yards; 56 men have availed themselves of the rest-rooms; 33 letters have been written by the railroad men at the rooms. The attendance on the four Sunday services aggregated 109, on the three Bible studies 20, and the total attendance at the rooms was 2,991. Thirteen new members have been added to the association in the month, bringing the membership up to 166. This is the high-water mark, and a comparison with the membership of 81 two years ago, when Secretary Felt took charge, will indicate the excellent work he has done. Progress is indicated, too, in the increase of 707 in the total attendance at the rooms over the number in July last year, and 1,040 over July, 1884. In the two years of his service the seating capacity of the hall has been increased, the wash-room enlarged and one bath added, and the rest-room fitted up.

The First Railroad in Canada.

Thursday last was the fiftieth anniversary of the opening of the first line of railway in Canada. The road was the Champlain & St. Lawrence, and it ran from Laprairie to St. Johns, 15 miles. To our modern notions, it was a queer affair. The rails were of wood with flat bars of iron spiked to them. The locomotive was a small arrangement, imported, with an engineer to manage it, from England. At the outset, the engine was unmanageable. It had a knack of coming to a standstill of its own accord, and of moving forward when it felt that way. In consequence of its vagaries, it was called the "Kitten." But a new engineer being engaged, it became controllable, the driver stating that the only trouble with the "Kitten" had been excessive economy in the matter of feeding it with wood and water. The rails, too, were guilty of strange freaks. Occasionally the rails would curl up under the pressure of the rolling stock, and then traffic would have to be suspended until repairs had been effected. The company to build the road was chartered on Feb. 25, 1832, just 11 years after the pioneer locomotive had made its first trip between Stockton and Darlington, and two years after the completion of the first railway in the United States. Five years elapsed between the charter and the rolling stock, and on July 21 the first train, with the Earl of Gosford and suite on board, made its journey from Laprairie to St. Johns and back. An engine and six cars composed the train, but the cars were too heavy for the "Kitten," so two went on behind the locomotive, making

the 15 miles in 50 minutes, while the remainder were hauled from terminus to terminus by horse-power.—*Toronto (Ont.) Mail*, July 27.

The Engineer's Story.

A party of civil engineers, among whom was Gen. D—, were running a line for a railroad through the mountains of Kentucky and crossed a forty-acre farm belonging to an old gentleman who came out to the party and inquired:

"Are you going to build a railroad through here, gentlemen?"

"That is our intention," answered the foreman.

"Well, now, I want to tell you you will have to pay me heavy damages. I wouldn't have a road through my farm for less than \$1,000, sir."

"How much do you value your farm at?" asked the good-natured foreman.

"Six hundred dollars, sir," proudly answered the old man, and he marched off in righteous indignation.—*Detroit Free Press*.

A Surprised Railroad Man.

General Passenger Agent Flanders, of the Boston & Maine, has a vein of dry humor which has not been obliterated by years of successful wrestling with the passenger business of a mammoth corporation, one of the best managed in the country. A stranger called on him a few days ago and said to him, presenting a trip pass over the Boston & Maine: "This pass was sent so much sooner, Mr. Flanders, than I expected, that it will run out before I am able to use the return half. Will you kindly extend it?" "My dear sir," said the genial passenger agent, "I am not only happy to do that, but very glad, indeed, to know you. You are the first man I ever saw or heard of that got a railroad pass sooner than he expected it."—*Detroit Free Press*.

A Singular Accident.

A peculiar accident has happened at the Islington railroad shops, Adelaide, South Australia. A 70-ton American consolidation engine, which was in a stationary position in the running shed, suddenly moved back into another engine. The rebound sent the first engine down a slight incline into another locomotive. It then ran into a paint shop, of which it wrecked the partition. Its further progress was stopped in this direction, but, rebounding again, it went on to another track, collided with four engines and damaged them all more or less. It is probable that the cause of the accident was that the throttle valve was leaking, thus admitting steam into the cylinders. The estimated damage done was £1,200, or say \$6,000.—*Mechanical World*.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Cincinnati, Hamilton & Dayton, special meeting, at the office in Cincinnati, Aug. 26, to vote on the proposed issue of preferred stock to retire the outstanding bonds.

Nashville, Chattanooga & St. Louis, annual meeting, in Nashville, Tenn., Sept. 15. Transfer books closed July 16.

Northern Pacific, annual meeting, at the office in New York, Sept. 16. Transfer books close Aug. 2.

St. Paul, Minneapolis & Manitoba, annual meeting, at the office in St. Paul, Minn., Aug. 19. Transfer books close July 21.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago & Alton, 2 per cent., payable Sept. 1, to stockholders of record Aug. 14.

Chicago & Eastern Illinois, 2½ per cent., semi-annual, payable Sept. 1, to stockholders of record on Aug. 14.

Chicago & West Michigan, 1 per cent., semi-annual, payable Aug. 16, to stockholders of record on Aug. 3. This company passed the August dividend last year and paid 2 per cent. last February.

Connecticut & Passumpsic Rivers, 2½ per cent., semi-annual, on the preferred stock, payable Aug. 2.

Detroit, Lansing & Northern, 3½ per cent., semi-annual, on the preferred stock, payable Aug. 16, to stockholders of record on Aug. 3.

Kansas City, Fort Scott & Gulf, 4 per cent., semi-annual, on the preferred stock, and 1½ per cent., semi-annual, on the common stock, both payable Aug. 16, to stockholders of record on Aug. 3. This company paid 2½ per cent. on the common stock in February and nothing in August, 1885.

Maine Central, 3 per cent., semi-annual, payable Aug. 2.

Marquette, Houghton & Ontonagon, 2½ per cent., semi-annual, on the preferred stock, payable Aug. 16, to stockholders of record on Aug. 7.

New York, Providence & Boston, 2 per cent., quarterly, payable Aug. 10.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Master Car & Locomotive Painters' Association* will hold its annual convention in Chicago, beginning on Wednesday, Sept. 8.

The *Brotherhood of Locomotive Firemen* will hold its annual convention in Minneapolis, Minn., beginning on Wednesday, Sept. 15.

The *General Time Convention* will hold its fall meeting in New York, on Wednesday, Oct. 18.

The *Western Society of Engineers* holds regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

General Baggage Agents' Association.

The semi-annual convention of this association was held at Niagara Falls, N. Y., July 21, President J. D. Marsten in the chair. The opening session, after the usual preliminaries, was devoted to the discussion of claims for indemnity account of baggage lost, delayed, etc., in the course of which some interesting and curious cases were presented. The consideration of this subject was continued at the morning session of the convention on July 22, at the conclusion of which the committee appointed to draft resolutions on the death of Mr. Swift, a member of the association, reported appropriate resolutions, which were unanimously adopted.

The Committee on the question of Sealing Baggage in Transit was increased to 7 members, in order that this question may be thoroughly inquired into, and was directed to report at the next meeting. Some changes in the order as prescribed in the by-laws was then discussed and agreed to. The committee appointed to consider a proposition made by the Traders & Travelers' Union of New York at the last meeting presented the following report:

"Your Committee have considered the proposition of the Traders & Travelers' Union to have accorded to persons holding their certificates an increased allowance of baggage. Your committee do not recommend entering upon the proposed arrangement with the Traders & Travelers' Union, since it would be, in their judgment, in the nature of a class privilege. Admitting all the advantages which are claimed

for the registry system to be real, your committee see no reason why all these advantages may not be secured through contracts with the Registry Co. direct, without the interposition of a third party having other objects, interests and methods than those pertaining to the business of the railway companies. If an increased allowance of baggage is to be granted in order to induce registration for the purpose of protecting the business of the railway companies, through that agency, your committee think that the privileges consequent upon registration should be open to all classes of persons, and that under such regulations as the railways themselves shall establish, without any possible complications with third parties. Holding these views, your committee recommend that the proposition of the Traders & Travelers' Union be declined."

This report was adopted by the convention.

Several members addressed the meeting, explaining in detail the working of the registration plan, as adopted on the Philadelphia & Reading, the Baltimore & Ohio, the Michigan Central and the Chicago & Grand Trunk roads. The practical result, as shown on those roads, was such as to lead their representatives to believe in the value of registration. It was also reported that it had been a complete check on excess collection, the receipts from excess baggage having shown a steady increase, notwithstanding the greater allowance of baggage made to travelers.

The remainder of the session was devoted to an informal discussion of various details of baggage business, and a comparison of the methods employed by different lines. It was decided to hold the next semi-annual meeting, which will take place on the third Wednesday in January next, in Atlanta, Ga., and the association then adjourned.

ELECTIONS AND APPOINTMENTS.

Cape Fear & Yadkin Valley.—Mr. J. Walker Fry has been chosen General Superintendent, with office at Fayetteville, N. C., in place of Mr. W. M. S. Dunn, who has gone to the Chesapeake & Ohio. Mr. Fry has been for some time past Division Superintendent on the Mobile & Ohio.

Chesapeake & Delaware Canal Co.—The board of managers has elected Coleman Nichol as Secretary and Treasurer in place of J. L. Wilson, the missing defaulter.

Chicago & Eastern Illinois.—Mr. Percival W. Clement, of Rutland, Vt., has been chosen a director in place of Mr. F. W. Huidekoper, resigned.

Chicago, Kansas & Western.—General Manager C. W. Smith announces the following appointments: J. F. Goddard, Assistant General Manager; G. R. Peck, General Solicitor; Don A. Sweet, Assistant Traffic Manager; W. F. White, General Passenger Agent; J. S. Leeds, General Freight Agent. The road is a proprietary line of the Atchison, Topeka & Santa Fe.

Cincinnati & Eastern.—Mr. W. D. Gray is appointed Auditor, in place of Russell Elliott, resigned.

Cincinnati, Hamilton & Dayton.—Mr. W. H. Fisher is appointed General Agent of the passenger department of this company at Indianapolis, Ind., in place of W. M. Shaw, resigned, to date from Aug. 1.

Mr. P. P. Young is appointed City Passenger Agent in Cincinnati, with office corner Fifth and Vine streets in that city, in place of C. L. Sares, resigned.

Cleveland & Marietta.—The officers of this company as reorganized are: President, A. F. Wikoff, Cambridge, O.; Secretary and Treasurer, G. H. Candee, New York.

Corwall & Lebanon.—Mr. Ned Irish has been appointed General Superintendent, Freight and Passenger Agent, with office at Lebanon, Pa., in place of J. C. Jennings, resigned.

Covington & Macon.—At the annual meeting in Macon, July 31, the following directors were chosen: N. E. Harris, W. H. Ross, Macon, Ga.; John C. Key, Monticello, Ga.; C. G. Talmage, W. B. Thomas, Athens, Ga.; B. W. Frobel, Atlanta, Ga.; Douglas Green, Norrin Green, H. M. Herman, A. C. Palmer, I. H. Sweetser, New York. The board elected H. M. Herman President; B. W. Frobel, Vice-President and General Manager; A. C. Palmer, Secretary and Treasurer.

Denver & Rio Grande.—Mr. Charles M. Hobbs has been appointed Purchasing Agent of this company, taking effect July 12, the date of reorganization of the company.

Kansas City & Pacific.—The directors of this new company are: Lee Clark, E. H. Edwards, C. H. Kimball, Parsons, Kan.; J. L. Loose, Kansas City, Mo.; A. McNally, J. Penfield, Chicago; W. H. Wolverton, New York.

Long Island.—Under date of July 27, I. D. Barton, General Superintendent, issued the following notice:

"Notice is hereby given that Mr. Benj. Norton has been appointed Assistant Superintendent of this road, to take effect immediately, and that under such title he will have charge of the Purchasing and Pay departments, as heretofore, in addition to such other duties as may devolve upon him. Such orders as he may have the right to issue under this title will be obeyed accordingly."

Middletown & Crawford.—This company (whose road is leased to the New York, Lake Erie & Western Co.) has elected directors as follows: R. M. Crosby, Crawford, N. Y.; Albert Bull, J. P. Madden, Middletown, N. Y.; S. M. Felton, Jr., John King, A. P. Macdonough, W. L. Strong, New York.

Missouri Pacific.—A circular has been issued by General Superintendent Kerrigan announcing that D. Brock, Superintendent of Transportation, having tendered his resignation, to take effect July 31, the office of Superintendent of Transportation is from that date abolished, and that C. W. Hequembourg, in addition to the duties already assigned him, is appointed Car Service Agent, and will have charge of the distribution of cars as between divisions. All reports heretofore made to the Superintendent of Transportation will, on and after Aug. 1, be made to the Car Service Agent, St. Louis.

Newport News & Mississippi Valley Co.—Mr. W. M. S. Dunn has been appointed General Superintendent of the Eastern Division (the Chesapeake & Ohio and the Elizabethtown, Lexington & Big Sandy roads), with office in Richmond, Va. Mr. Dunn was formerly for several years General Superintendent of the Chesapeake & Ohio; he left the road in 1881 to become Engineer and Superintendent of the Virginia Midland, where he remained until February of last year, when he was appointed General Superintendent of the Cape Fear & Yadkin Valley road. He now leaves the last-named line and returns to the Chesapeake & Ohio.

New York City & Northern.—The following order from Receiver Joel B. Erhardt is dated New York, July 26: "Beginning Aug. 1 the following changes and appointments will be in effect: Mr. Frank S. Gannon having resigned to take an important position on the Baltimore & Ohio Railroad, the office of General Superintendent will remain vacant until further notice. Mr. H. C. Willets is appointed Traffic Manager; Mr. M. W. Maguire, Master of Transportation;

Mr. C. P. Curtis, Car Accountant; Mr. W. H. Rockwell, Purchasing Agent. Mr. Thomas Millen will continue as Master of Machinery, and Mr. H. C. Moore as Roadmaster. The office of General Freight and Passenger Agent will be abolished. All heads of departments will report direct to the Receiver.

"In accordance with the foregoing changes and appointments, the Traffic Manager will have general charge of everything pertaining to the procurement of traffic; examination of all claims for loss and damage in connection with traffic, and make vouchers for same; distribution of all tickets; preparation of all tariffs; control of 53d street and Pier 40 stations, also floatage; see that all agents, home and foreign, are instructed in matters pertaining to traffic, and conduct all traffic arrangements with foreign roads.

"The Master of Transportation shall have the care of the movement of trains and control of all men employed in the train-service, including station men, and engineers and firemen while on the road. He shall require strict observance of the rules of the road by those under him, and be responsible for the safe and economical running of trains.

"He shall make from time to time such suggestions to the Receiver, in relation to the operations of the road, as may seem to him necessary to promote its interests. He will keep the Receiver promptly and fully advised of all accidents and important occurrences and transactions in connection with the operating department of the road, and perform such other duties as may be assigned to him by the Receiver. He shall examine all candidates for position of engineer or fireman, as to their fitness for the place in matters of train movements, signals, etc., and must approve of the appointments before they are made.

"The Master of Machinery shall have charge of all machine and repair shops, and of all equipment and machinery, and keep the same in good order and condition. He shall have control of all men employed in building, repairing, maintaining and cleaning engines, cars and machinery, and of locomotive engineers and firemen, except when they are on the road with their engines. He shall only appoint and transfer engineers and firemen with the approval of the Master of Transportation, and shall furnish engines and cars in accordance with the directions of the Master of Transportation.

"The Roadmaster shall have general supervision of the road-bed, tracks, bridges, fences and buildings, giving particular attention to the maintenance of the same. He shall cause them to be kept in good repair, and diligently watched and protected against accident. He shall respond to any call made by the Master of Transportation in matters connected with the daily movement of trains. He shall have full control of all employees in his department.

"Heads of departments will make out and approve the pay-rolls of all the men employed under their direction, and be responsible for the proper discipline in their departments; also for the economical use of all supplies used in their respective departments."

New York, Lake Erie & Western.—Mr. J. F. O'Brien is appointed Superintendent of the Mahoning Division of the leased New York Pennsylvania & Ohio road, in place of N. F. Wood, resigned. Mr. O'Brien began railroad service 17 years ago as Assistant Engineer of the Mobile & Montgomery road, and 8 years later was appointed Assistant Superintendent of the Memphis & Charleston road. After serving on that line for a few months he was appointed Chief Engineer and Assistant Superintendent of the East Tennessee, Virginia & Georgia road, and 3 years later was made General Superintendent. A little over a year ago he left that road and was appointed General Manager and Agent for the Receiver of the Lackawanna & Pittsburgh road, which position he has since held.

Pennsylvania.—The following circular from Mr. Theo. N. Ely, General Superintendent of Motive Power, is dated Altoona, Pa. July 27:

"Mr. John W. Cloud, Engineer of Tests, has been appointed Mechanical Engineer, vice Mr. J. B. Collin, deceased, to date from Aug. 1. The office of Engineer of Tests will from that date be merged into that of Mechanical Engineer, and the Department of Physical Tests will be in charge of the Mechanical Engineer, who will make investigations, examine current supplies and materials to be purchased, and perform the other duties which pertain to that department."

Rio Grande.—The officers of this company are: President, Alexander Werbskie; Secretary and Treasurer, Wm. A. Valls. Office at Brownsville, Texas.

St. Joseph & Grand Island.—Mr. Wm. Lush is appointed Chief Engineer, to date from Aug. 1. He has been for 18 years past connected with the New York Central & Hudson River road.

St. Louis, Arkansas & Texas.—Mr. W. H. Selby has been appointed Master Mechanic, with office in Tyler, Tex. He was recently on the Council Bluffs & St. Louis road.

St. Louis, Ft. Scott & Wichita.—The following order from Superintendent R. Harding is dated Wichita, Kan., Aug. 1: "On and after this date the office of Trainmaster of these lines will be abolished. Wm. P. McNair, Assistant Superintendent, will, in addition to his present duties, assume those formerly performed by the Trainmaster. All persons in the train and station service will report to him at Wichita, Kansas."

St. Paul, Minneapolis & Manitoba.—Mr. William E. Smith has been appointed General Solicitor of this company, and from Aug. 1 will have general charge of all legal business of the company.

Savannah & Tybee.—This company was organized in Savannah, Ga., July 28, by the election of the following directors: Henry Blun, J. H. Estill, Samuel P. Hamilton, John J. McDonough, Herman Myers, D. G. Purse, J. C. Rowland. The board elected Capt. D. G. Purse, President; John W. Burroughs, Secretary and Treasurer; Capt. John Postell, Chief Engineer.

Sinnemahoning Valley.—M. William McMurtry is appointed Superintendent of this road, with headquarters at Keating Summit, Pa., to date from Aug. 1.

Syracuse & South Bay.—The directors of this new company are: G. A. Crownhart, Canastota, N. Y.; Stephen D. Lake, George S. Wales, Rochester, N. Y.; James C. Rawn, Geddes, N. Y.; H. McGonagall, Albert O. Matthews, Walter S. Wales, Syracuse, New York.

Texas & Pacific.—Mr. W. W. Finley has been appointed General Freight Agent, succeeding Mr. Oscar G. Murray, who recently resigned the position of Traffic Manager.

Dr. F. Eades has been appointed Chief Surgeon, and will have charge of the Hospital Department, with office at Marshall, Texas.

Washington & Idaho.—The directors of this new company are: H. W. Livingstone, J. A. Perkins, Colfax, Wash. Ter.; Isaac Cooper, Julius Garland, Warren Sayre, Horace F. Stratton, George W. Truax, Wiley A. Walker, Farmington, Washington Territory.

West Feliciana.—J. Stewart McGehee is now Secretary, Treasurer and Accountant of this company. The general offices are at Woodville, Mississippi.

PERSONAL.

—Mr. N. F. Wood has resigned his position as Superintendent of the Mahoning Division of the New York, Pennsylvania & Ohio road.

—Mr. C. J. Waller has resigned his position as General Passenger and Ticket Agent of the Mobile & Ohio Railroad, and will go into business in Chicago.

—It is reported that Mr. John M. Egan has resigned his office as General Superintendent of the Canadian Pacific, to accept a position on the St. Paul, Minneapolis & Manitoba road.

—Mr. W. H. Selby has resigned his office as Superintendent of Machinery and Car Department of the Council Bluffs and St. Louis Railroad, to accept a position on the St. Louis, Arkansas & Texas road.

—Mr. F. L. Cleapor, for a number of years connected with the Northeastern Railroad of South Carolina, has closed his connection with that company and has removed to Boston, where he will engage in private business.

—Mr. F. H. Kingsbury, who occupies the newly-created office of Through Freight Agent of the Pennsylvania Railroad, has established his office at No. 346 Broadway, in the building where Mr. Fink's offices are situated.

—Mr. William Lush has resigned his position as Assistant Chief Engineer of the New York Central & Hudson River road to accept a position on the St. Joseph & Grand Island Railroad. Mr. Lush has been with the New York Central for 18 years past.

—It is reported that Mr. J. A. Earling, Assistant Superintendent of the Chicago, Milwaukee & St. Paul road, has been offered an important position on the Canadian Pacific, but has not yet decided whether to accept this position or to retain his present office.

—Col. Charles L. Schlatter, formerly General Manager and Vice-President of the Brunswick Western road, and at one time Chief Engineer of the State of Pennsylvania, died at Brunswick, Ga., Aug. 4, in the 79th year of his age. Col. Schlatter was one of the oldest civil engineers of note in the United States.

—Mr. Harrison Durkee, for many years a prominent broker on the New York Stock Exchange, died at his residence in that city, Aug. 4, aged 73 years. He was for many years a director of the Western Union Telegraph Co., and for some time past Vice-President also. He was a director of the New York, Lake Erie & Western Co. from the organization of the present company until two years ago.

—Mr. Frank S. Gannon has resigned his office as General Superintendent of the New York City & Northern road, to accept an important position on the Baltimore & Ohio. Mr. Gannon has addressed a farewell letter to the officers and employees of the road, thanking them for the manner in which they have performed their duties during the past 5 years under his charge. On the evening of July 31 the employees presented Mr. Gannon with a valuable watch and chain as a testimonial of their esteem for him.

—Mr. J. W. Cary died Aug. 3, in Cleveland, O. Mr. Cary entered the service of the Cleveland, Painesville & Ashtabula road 35 years ago as a clerk in the freight office, and was gradually promoted until he became General Passenger Agent of the road. When the road became part of the Lake Shore & Michigan Southern by consolidation he was made General Ticket Agent of the consolidated company. Some two years ago continued ill health forced him to retire practically from work, but the directors refused to accept his resignation until last January, when all hopes of his recovery had passed. A few months ago it became necessary to remove him to the insane asylum at Cleveland, and he died in the asylum. At the time of his retirement Mr. Cary was the oldest in service of the general officers of the Lake Shore road. He was an exceedingly careful and painstaking officer, and his sickness and mental failure are said to have resulted from overwork.

—Hon. Samuel J. Tilden died suddenly at his summer residence, Greystone, near Yonkers, N. Y., on the morning of Aug. 4, aged 72 years. Although he had been physically weak for some time past, his death was entirely unexpected; it was caused by failure of the heart. His career as a statesman and a great party leader will be sufficiently told by the daily papers; to railroad men he is known chiefly as a great lawyer, whose practice was largely in railroad and corporation law. Of this part of his career the New York Evening Post says:

"Mr. Tilden continued his practice of the law for 35 years until he was elected Governor in 1874, and he was often consulted on important matters, especially relating to corporations in which he was interested, many years later. His analytical powers were naturally great, and his arguments in court and his examination of witnesses showed the perfection of method. Judge Hogeboom is reported to have said of him once, speaking of a case which he occupied a day and a half in summing up, that 'he spoke as if in a trance.' He was employed in many very important corporation cases, and it was said 12 years ago that 'more than half the railroad enterprises of the West, north of the Ohio and between the Hudson and Missouri Rivers, during the last 20 years have, in one way or another, stood in the relation of clientage to Mr. Tilden.' In a case conducted for the Cumberland Coal Co. in Maryland, he established the legal principle that a trustee cannot deal with trust property. In preparing the defense of a case of the Delaware & Hudson Canal Co. against the Pennsylvania Coal Co., it is related that he employed 12 clerks for a year gathering statistics and general information about canal navigation."

Mr. Tilden carried through the reorganization of the Chicago & Alton, the St. Louis, Alton & Terre Haute and other companies. He was a director in those and other railroad companies for a time, and served as a director of the Pittsburgh, Fort Wayne & Chicago up to the time of his death.

TRAFFIC AND EARNINGS.

Coal.

Coal tonnages for the week ending July 24 are reported as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Anthracite.....	634,670	669,315	D. 34,645	0.2
Eastern bituminous.....	270,958	222,121	I. 48,837	22.0
Coke.....	75,987	49,747	I. 26,240	52.7

The anthracite market is dull, with unusually light buying reported. It is claimed that all the companies are adhering to the agreement to raise and maintain prices.

Bituminous shippers, as usual at this season, are complaining that their shipments are limited by a short supply of cars.

Coke shipments continue to show a very large gain over last year's output.

Cumberland coal shipments for the seven months to July 31 are given by the Cumberland *Citizen* as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Baltimore & Ohio R. R.....	879,182	1,137,015	D. 257,833	22.7
Bedford Div., Penna. R. R.....	152,853	238,053	D. 85,200	35.8
Chesapeake & Ohio Canal.....	82,011	174,002	D. 91,991	52.9

Total.....1,114,046 1,549,070 D. 435,024 28.1

Local deliveries are included in Baltimore & Ohio shipments. The decrease this year is due to the long strike of the miners.

Actual tonnage passing over the Huntingdon & Broad Top Mountain road for the seven months to July 31 was:

	1886.	1885.	Inc. or Dec.	P. c.
Broad Top coal.....	217,383	94,313	I. 123,070	130.5
Cumberland coal.....	171,598	265,090	D. 93,492	35.3
Total.....	388,981	359,403	I. 29,578	8.2

The Broad Top coal is mined on the line; the Cumberland is carried through from Mt. Dallas to Huntingdon for the Pennsylvania Railroad.

For the six months to June 30 the Tennessee Coal, Iron & Railroad Co. shipped from its mines 74,795 tons of coal and 75,594 tons of coke; a total of 150,389 tons. The coke shipments show a large increase, and for the half-year exceeded those of coal.

The coal tonnage of the Pennsylvania Railroad Division of the Pennsylvania Railroad for the seven months to July 31 was:

	1886.	1885.	Inc. or Dec.	P. c.
Coal.....	6,633,317	6,197,664	I. 435,653	7.0
Coke.....	1,937,066	1,479,598	I. 457,468	31.0
Total.....	8,570,383	7,677,262	I. 893,121	11.7

This includes all coal and coke passing over the road, whether mined on the line or received from other roads. The details of the tonnage this year are as follows:

	Line of road.	From other lines.	Total.
Anthracite.....	1,039,717	1,841,927	2,881,644
Bituminous.....	2,984,989	708,684	3,693,673
Coke.....	1,910,784	26,882	1,937,666
Total.....	5,935,490	2,635,493	8,570,983

The gain in tonnage this year was made in spite of the stoppage of production by strikes for several weeks in the principal bituminous districts.

The anthracite coal tonnage of the Belvidere Division, Pennsylvania Railroad, for the seven months to July 31 was:

	1886.	1885.	Inc. or Dec.	P. c.
Coal Port for shipment..	36,783	45,895	D. 9,112	19.8
S. Amboy.....	291,756	334,024	D. 42,268	12.6
Local points on N. J. divs	445,429	435,270	I. 10,159	2.3
Co.'s use.....	131,337	127,628	I. 3,709	2.9
Total.....	905,305	942,817	D. 37,512	4.0

Of the total this year 754,081 tons were from the Lehigh Region, and 151,223 tons from the Wyoming Region.

Cotton.

Cotton movement for the eleven months of the crop year from Sept. 1 to July 30 is reported by the *Commercial and Financial Chronicle* as follows, in bales:

	1885-86.	1884-85.	Inc. or Dec.	P. c.
Receipts.....	3,357,337	2,623,015	I. 734,322	28.0
Shipments.....	3,315,591	2,619,652	I. 695,938	26.6
Stock, July 30.....	57,626	20,578	I. 37,048	179.8
Receipts.....	5,298,672	4,723,913	I. 574,759	12.2
Exports.....	4,240,468	3,854,216	I. 386,252	10.0
Stock, July 30.....	234,767	214,485	I. 20,282	9.5

It must be remembered that a large part of the cotton shipped from interior markets appears a second time in the receipts at the seaports.

The *Chronicle* says: "In the table below we give the receipts from plantations, and add to them the net overland movement to July 1, and also the takings by southern spinners to the same date, so as to give substantially the amount of cotton now in sight:

	1885-86.	1884-85.	1883-84.	1882-83.
Receipts at the ports to July 30.....	5,298,672	4,723,913	4,805,767	5,940,554
Interior stocks on July 30 in excess of Sept. 1.....	41,776	3,363	*26,849	41,401
Tot. receipts from plantations.....	5,340,448	4,727,276	4,778,918	5,981,955
Net overland to July 1.....	816,558	605,566	573,605	637,698
Southern consumption to July 1.....	300,000	261,000	292,000	348,000
Total in sight July 30.....	6,457,006	5,593,842	5,644,523	6,937,653

Northern spinners' takings to July 30..... 1,734,261 1,349,688 1,535,261 1,708,113

* Decrease from Sept. 1.

"It will be seen by the above that the increase in amount in sight July 30, as compared with last year, is 863,164 bales, the increase as compared with 1883-84 is 812,483 bales, and the decrease from 1882-83 is 480,647 bales."

Lake Superior Iron Ore.

Shipments of iron ore from the Lake Superior region from the opening of navigation to July 28 are given by the *Marquette Mining Journal* as follows, in tons:

	1886.	1885.	Inc. or Dec.	P. c.
Marquette District, L'Anse.....	19,136	D. 19,136	100.0	
" " Marquette.....	415,032	300,327	I. 114,705	38.2
" " St. Ignace.....	28,509	38,117	D. 9,608	25.3
" " Escanaba.....	262,370	264,373	D. 2,003	0.8
Menominee Dis., Escanaba.....	423,099	356,247	I. 66,852	18.8
Gogebie Dis., Ashland.....	286,078	I. 286,078		
Vermilion Dis., Two Harbors.....	129,200	I. 129,200		
Total.....	1,544,288	978,200	I. 566,088	57.9

The total from the Marquette District was 705,911 tons. Pig iron shipments were: Marquette, 2,059; St. Ignace, 6,344; total, 8,403 tons.

St. Louis East-Bound Pool.

Arbitrator Gault has announced his awards of percentages for the roads in the St. Louis east-bound pool. The awards, as compared with the old division, are as follows:

	Dead freight.	Live stock.	Old.	New.
Chicago & Alton.....	20.0	20.0	23.0	21.5
Indianapolis & St. Louis.....	20.0	20.0	21.5	21.5
Ohio & Mississippi.....	18.5	20.0	9.5	10.0
Vandalia line.....	21.5	20.0	24.5	25.5
Wabash.....	20.0	20.0	21.5	21.5
Total.....	100.0	100.0	100.0	100.0

The awards, it is said, are not satisfactory to all the roads, and some of them will ask for a rehearing.

Chicago-Ohio River Pool.

The general freight agents of the roads in the Chicago-Ohio River pool met in Chicago, Aug. 3, for the purpose of agreeing upon steps to be taken in relation to the refusal of the southern lines to allow the lines in the Chicago-Ohio River pool the privilege of making rates to southern points. After some discussion it was resolved that the rates or heavy freight from Green Line points to points in the Chicago-Ohio River pool territory should be made on the Ohio River basis, and that the rates and divisions should be submitted to the Commissioner of the southern pool for approval, and that no change shall be made in through rates and divisions until they have been approved also by the Commissioner of the Chicago-Ohio River pool.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Seven months to July 31:

	1886.	1885.	Inc. or Dec.	P. c.
Buf. N. Y. & Pn.	\$1,442,437	\$1,290,743	I. \$151,694	11.4
Huff. Roch. & P.	622,520	661,220	D. 38,700	5.9
Central Iowa.	593,622	633,269	D. 40,353	6.2
Chi. & Alton.	4,224,668	4,307,329	D. 82,661	1.9
Chi. & East. Ill.	923,497	876,464	I. 47,033	7.7
Chi. Mil. & St. P.	12,675,000	12,505,933	I. 169,067	1.3
Long Island.	1,618,143	1,542,524	I. 75,620	4.9
Mil. L. S. & W.	1,066,504	678,471	I. 388,033	57.2
St. L. & S. F.	2,437,321	2,313,080	I. 124,241	5.4

Six months to June 30:

Net earnings.....	2,942,767	3,124,939	D. 182,172	5.5
Camden & Atl.....	214,525	206,038	I. 8,487	4.1
Net earnings.....	*4,264	80	D. 4,352	
Chi., Bur. & Q.....	11,523,358	12,372,967	D. 849,609	6.9
Net earnings.....	4,844,133	5,155,647	D. 311,514	6.0
Dan. & Norwalk.....	99,670	94,853	I. 4,817	5.1
Gulf. Col. & S. F.....	911,386	599,304	I. 312,082	52.0
Mexican Central.....	1,833,263	1,880,696	D. 46,833	2.5
Net earnings.....	587,397	833,899	D. 246,502	20.2
Miss. & Tenn.....	180,391	234,602	D. 54,211	23.1
N. Y. & New E.....	1,792,154	1,513,915	I. 278,239	18.4
Net earnings.....	583,643	438,390	I. 145,253	33.1
Northern Pacific.....	4,988,256	4,606,431	I. 381,825	8.3
Net earnings.....	2,170,244	2,494,494	D. 324,250	12.9
Union Pacific.....	11,606,088	11,224,530	I. 381,558	3.4
Net earnings.....	3,161,323	3,274,667	D. 113,344	3.4
West Jersey.....	545,638	510,793	I. 34,845	6.8
Net earnings.....	176,647	184,881	D. 8,234	4.4

Five months to May 31:

	1886.	1885.	Inc. or Dec.	P. c.
Cl., C. C. & I.	\$1,483,486	\$1,348,477	I. \$135,009	10.0
Net earnings.....	441,084	244,058	I. 197,026	80.7
Gal., Ha. & S. An.	1,031,373	1,158,073	D. 126,700	10.9
Net earnings.....	91,559	493,703	D. 402,144	80.6
Guif., W. T. & P.	20,404			
Net earnings.....	*4,118			
Louisiana West.....	251,755	244,434	I. 7,321	3.0
Net earnings.....	122,685	127,668	D. 4,983	3.9
Morgan's La. & T.	1,689,605	1,587,410	I. 102,195	6.4
Net earnings.....	435,135	557,027	D. 121,892	21.9
N. Y., T. & Mex.	52,493			
Net earnings.....	*11,018			
Rome, W. & O. g.	821,095	608,795	I. 212,300	34.4
Tex. & N. Orl'n's	370,898	375,620	D. 4,722	1.3
Net earnings.....	147,565	156,261	D. 8,696	5.6
Tol. & Ohio Cent.	291,276			

Month of May:

Net earnings...	100,522	49,044	I.	51,478	105.0
Gal., Ha. & S. A.	191,471	250,522	D.	59,051	23.1
Net earnings...	*18,713	119,413	D.	138,126	
Gulf, W. T. & P.	3,507	5,944	D.	2,437	41.3
Net earnings...	*1,373	508	I.	865	102.7
Louisiana West...	46,560	44,730	I.	1,830	4.1
Net earnings...	18,070	21,934	D.	3,864	17.6
Morgan's La. & T.	276,738	293,932	D.	17,194	5.9
Net earnings...	34,355	78,849	D.	44,494	56.2
N. Y., Tex. & M.	11,430	23,500	D.	12,070	51.3
Net earnings...	*1,558	7,000	D.	5,442	
Rome, W. & O.	212,058	133,645	I.	78,413	58.5
Tex. & N. Orl's	63,092	75,702	D.	12,610	16.7
Net earnings...	17,933	32,769	D.	14,837	45.2

Month of June:

Atch., T. & S. F.	\$1,252,754	\$1,218,772	I.	\$33,982	2.8
Net earnings....	613,606	557,237	I.	56,369	10.1
Camden & Atl.	53,341	50,388	I.	2,953	5.9
Net earnings....	7,939	7,989	D.	50	0.6
Chi., Bur. & Q.	2,148,532	1,992,485	I.	156,047	7.8
Net earnings....	939,076	768,287	I.	170,789	22.3
Dan. & Norwalk..	19,264	18,549	I.	715	3.9
Gulf. Col. & S. F.	161,358	126,426	I.	34,932	17.7
Mexican Cen....	274,764	278,770	D.	4,006	1.4
Net earnings....	78,712	90,484	D.	20,772	20.8
Miss. & Tenn....	22,949	31,553	D.	8,604	27.2
N. Y. & New E.	314,317	271,057	I.	43,260	16.0
Net earnings....	96,520	81,263	I.	15,257	18.8
Northern Pac....	1,077,356	1,012,507	I.	64,849	6.3
Net earnings....	559,284	564,886	D.	5,602	1.0
Tol. A. & N. M.	24,236	23,350	I.	886	3.8
Union Pacific....	2,263,822	1,553,396	I.	308,429	15.8
Net earnings....	538,297	400,486	I.	128,817	32.3
West Jersey....	115,380	111,048	I.	4,332	3.9
Net earnings....	46,562	49,156	D.	2,594	5.3

Month of July:

Buff. N. Y. & P.	\$241,800	\$207,300	I.	34,500	16.7
Buff. R. & P.	114,312	106,909	I.	7,403	6.9
Central Iowa	99,042	93,916	I.	5,126	5.5
Chicago & Atl.	129,807	99,910	I.	29,897	44.3
Chi. & Alton	714,803	688,393	I.	26,410	6.9
Chi. & East. Ill.	137,834	114,064	I.	23,770	20.6
Chi. Mil. & St. P.	2,036,000	1,893,976	I.	142,024	7.8
Long Island	391,661	373,079	I.	18,582	5.0
Mil. L. S. & W.	238,716	112,818	I.	125,898	111.4
St. Louis & San F.	407,818	326,078	I.	81,740	25.1

Third week in July:

Cairo, V. & C.....	\$19,714	\$8,629	I.	\$11,085	128.7
Flint & Pere Mar.	43,580	32,613	I.	10,967	33.6
Ind., Bloom. & W.	56,403	40,642	I.	15,761	38.8
Long Island.....	90,564	95,170	D.	4,606	4.9

* Deficit.

Weekly earnings are usually estimated in part, and are subject to correction by later statements. The same remark applies to early statements of monthly earnings.

Buffalo Grain Traffic.

Buffalo grain receipts by lake from the opening of navigation up to July 31 were as follows for four years past, flour in barrels and grain in bushels, flour being reduced to wheat in the totals:

	1886.	1885.	1884.	1883.
Flour.....	1,935,778	894,423	867,590	908,015
Grain.....	31,435,585	20,705,312	18,444,180	25,761,405

Total, bushels..... 41,114,475 25,177,427 27,782,430 30,301,480

The total increase this year over 1885 was 15,937,048 bushels, or 63.3 per cent.

For the same period shipments eastward of grain received by lake have been, in bushels:

	1886.	1885.	1884.	1883.
By canal.....	18,912,850	12,537,013	13,138,451	17,648,462
Ry rail.....	10,881,379	5,988,690	4,269,464	5,598,586

Total..... 29,794,229 18,525,103 17,407,915 23,247,048

Per cent. by rail..... 36

nouncing the opening of a new transcontinental line from St. Paul and Minneapolis to Vancouver, B. C., and all points on Puget Sound and the Pacific coast. The Manitoba train from St. Paul will connect each day, except Wednesday, at Winnipeg with Canadian Pacific through express train for Vancouver. The connection with the last named point from the other points on the coast will be by steamer.

Chesapeake & Ohio.—President C. P. Huntington has issued a circular to the holders of the currency bonds and the Series B bonds of this company, in which, after reciting the organization of the Newport News & Mississippi Valley Co. and its leases of the Chesapeake & Ohio and its western extensions, the following proposition is presented:

1. Holders of Chesapeake & Ohio currency bonds are asked to surrender their bonds with all matured coupons attached, and to receive in exchange 125 per cent. of their par value in the capital stock of the Newport News & Mississippi Valley Co.

2. Holders of the Series B bonds are asked to accept interest on their bonds at the rate of 4 per cent. from May 1, 1886, and to extend the maturity of the bonds to May 1, 1888, and are offered in return for the reduction in interest 25 per cent. of the par value of their bonds in the capital stock of the Newport News & Mississippi Valley Co. In both cases provisions will be made for preserving all the legal rights of bondholders and also for restoring them to their original position in case the plan should not be accepted by holders of a majority of the securities. The circular states that a number of the large holders who have been consulted have approved the plan and promised to assent to it.

The advantages which the circular urges upon bondholders are, that the holders of currency bonds will have a better prospect of dividends on the stock than they have for cash interest on their bonds, should existing conditions continue. It is also claimed that the Series B bonds would command a better price with 4 per cent. interest promptly paid than they do now with 6 per cent. nominal interest and uncertain payment, while holders will have the addition of the stock bonus. The necessary details for carrying out this arrangement are being perfected and the new securities will be ready for issue by Sept. 1 next.

Chicago & Atlantic.—A meeting of the first-mortgage bondholders has been called by the trustee, the Farmer's Loan & Trust Co., to be held at its office in New York, Aug. 17, to consider the question of reorganization of the company and the settlement with the New York, Lake Erie & Western. The plan to be proposed, it is said, will require the issue of first mortgage bonds on the road to the amount of \$12,000,000, to bear 4 per cent. for 5 years and 5 per cent. thereafter. The present first mortgage bonds are to be exchanged for the new bonds at 105 and the present second mortgage bonds for the new bonds at 40. The advances made to the company by the Erie and other claims to be adjusted are to be paid in new bonds, the amount being about \$2,000,000. There will remain a balance of about \$2,000,000 which will be used for improvements of the road and similar purposes. The New York, Lake Erie & Western Co. is to guarantee the interest on the new bonds, and in return for this guarantee is to receive one-half the stock of the reorganized company, the other half to go to the present stockholders. Some modifications of this plan may be made before it is finally submitted to the bondholders.

Chicago, Burlington & Quincy.—It is understood that the extension of this company's Burlington & Missouri River line, which is now under construction from Grand Island, Neb., northwest, is to be pushed this year for at least 100 miles into northern Nebraska. The company has also under consideration the building of another extension, to run from the new line westward into Wyoming. This extension, if built, will be parallel to but at some distance from the Chicago & Northwestern line to Fort Fetterman, and, like that line, its object will be to secure a share in the cattle traffic from Wyoming.

It is reported that the short line which the company is now building from Denver, Colo., to the coal fields is really intended as the commencement of a line to run from Denver westward to a connection with the Denver & Rio Grande Western, thus making, in connection with that road, a new line from Denver to Ogden.

The Holdrege line of the Burlington & Missouri River road is now completed and opened for business to Farnam, Neb., 22 miles westward from the late terminus at Elwood and 51 miles from Holdrege.

The Grand Island Branch of this company's Burlington & Missouri River line is now completed to Ravenna, Neb., 31 miles westward from the late terminus at Grand Island and 123 miles from Lincoln. Work is in progress for the extension of this branch westward.

The statement for June and the six months to June 30 is as follows:

	1886.	1885.	Six months.	1886.	1885.
Earnings	\$2,148,532	\$1,992,485	\$11,523,358	\$12,672,917	
Expenses	1,268,456	1,224,198	6,679,225	7,217,320	

Net earnings... \$939,076 \$768,287 \$4,844,133 \$5,155,647
For the half-year the gross earnings decreased \$849,609, or 6.9 per cent., and the expenses \$538,095, or 7.5 per cent., the result being a decrease of \$311,514, or 6.0 per cent., in net earnings.

Chicago, Burlington & Northern.—The statement of work for the week ending July 24, gives the track laid as follows:

	Week.	Total.
Main line	13 miles 51 ft.	338 miles 4,680 ft.
Permanent sidings	1 " 1,054 "	22 " 3,501 "
Temporary sidings	597 "	18 " 3,816 "
Total	14 miles 1,702 ft.	380 miles 1,437 ft.

On July 24 the main line track remaining to be laid was 16 miles 2,220 ft., of which 13 miles 3,190 ft. were between East Dubuque and the Wisconsin River, and 2 miles 4,310 ft. between Oregon, Ill., and Savanna.

Chicago, Madison & Northern.—This company has filed articles of incorporation to build a railroad from Freeport, Ill., northward to Madison, Wis. It is reported that the new company is organized in the interest of the Illinois Central, with whose road its line will connect at Freeport. Surveys are now in progress for the projected line and the report is that it is to be built at once and that it will probably be extended to St. Paul.

Cincinnati, Hamilton & Dayton.—Notice is published that the stockholders will hold a special meeting at the office in Cincinnati, on Aug. 26, next, "to consider and vote upon a proposition to increase the capital stock of said company by issuing preferred stock to an amount not exceeding the amount of the bonds and guaranteed stocks of said company and the stocks and bonds of other companies upon which said company is liable as guarantor. Said preferred stock to be guaranteed a dividend of 6 per cent. per annum, and to be redeemable at any time after three years from the date of issue, but said dividend to be reduced to 4 per cent. if the right of redemption shall not be exercised until the expiration of 10 years from the date of issue, 4 per cent. being paid in the meantime; the proceeds of said stock to be used only for the purpose of retiring bonds of this company and guar-

anteed stocks and bonds upon which this company is liable. Said preferred stock is not to have the voting power."

The company has further placed at par \$500,000 of bonds at 4 per cent. for current improvements. This is the remaining half of the \$1,000,000 authorized in 1882.

Cleveland & Canton.—The new or Corbin directors began suit in the Circuit Court at Canton, O., July 30, for an injunction to restrain the Blood directors, who are now in possession of the road, from pledging or in any way disposing of any common or preferred stock of the company, or from exchanging such stock for the purpose of shares of the Boston Equipment Co., the Boston Car Trust Association, or the Cleveland Terminal Trust Association, also from purchasing or acquiring any shares or interest in those associations, or from issuing or in any way disposing of any of the stock of the company. The court granted the usual temporary injunction pending a full hearing.

Cleveland, Columbus, Cincinnati & Indianapolis.—The statement for May and the five months to May 31 is as follows:

	May.	1885.	Five months.	1885.
Earnings	\$309,323	\$294,031	\$1,483,486	\$1,348,477
Expenses	208,801	314,987	1,042,402	1,104,419
Net earnings	\$100,522	\$49,044	\$441,084	\$244,058
Charges	69,963	70,998	344,442	323,645
Surplus	\$30,559	\$*21,054	\$96,642	\$*20,587

* Deficit.

For the five months the gross earnings increased \$135,009, or 10.0 per cent., and the expenses decreased \$62,017, or 5.6 per cent., the result being a gain in net earnings of \$197,026, or 80.7 per cent. The charges (interest, taxes, etc.) increased \$20,797, or 6.4 per cent., the result being a surplus of \$96,642, as compared with a deficit of \$79,587, showing a net gain of \$176,229.

Expenditures for additions to property for the five months of this year amounted to \$87,429, leaving a balance of \$9,213 as net surplus.

Cleveland & Western.—This company has been organized by Pittsburgh parties who have bought the Cleveland, Delphos & St. Louis road. This road is a narrow-gauge line, extending from Delphos, O., eastward to Carey, 56 miles. It was originally intended as a Cleveland connection for the Toledo, Cincinnati & St. Louis, although an entirely independent company. It was not successful, however, and after struggling along for a time the road was sold under foreclosure in the early part of this year. It is chiefly owned by Pittsburgh parties who are interested in the Pittsburgh & Western road, and it is understood that it will be changed to standard gauge, and run as a branch of the Pittsburgh & Western. Among the Pittsburghers interested are James Callery, William Semple, John Chalfant, A. M. Byers, Campbell Herron and J. Painter.

This is one of the roads which were claimed as part of the Great Eastern & Western Air Line from Punksutawny to Council Bluffs, which was recently advertised with a great flourish in London.

Columbus & Western.—Surveys are now in progress on the extension of this road from its present terminus at Goodwater, Ala., to Birmingham. The distance is 74 miles, and contracts are to be let as soon as the line is located. There is some heavy grading on the line and it will be quite an expensive road to build. The principal object of the extension is to connect at Birmingham with the new Kansas City, Memphis & Birmingham road.

Covington & Macon.—At the annual meeting in Macon, Ga., last week, it was resolved that the general offices of the company should be hereafter located in Macon. The directors were instructed to push the work on the road as rapidly as possible. The stockholders also voted to authorize the building of a branch from Monticello, Ga., through Madison to Athens. The officers reported the work on the road to be progressing steadily, with a prospect of its early completion.

Danbury & Norwalk.—It is announced that the lease of this road to the Housatonic Railroad has been finally agreed upon, and will be submitted to the stockholders for their approval. As stated last week, the rental will be interest on the bonds and 5 per cent. on the stock. If ratified, the lease is to take effect Oct. 1 next.

Delaware & Hudson Canal Co.—The statement to the Railroad Commission for the leased lines in the state of New York is as follows:

	Gross earn.	Net earn.	Deficit.
A'baby & Susquehanna	\$667,210	\$238,227	\$12,266
N. Y. & Canada	177,826	52,457	14,472
Rensselaer & Saratoga	534,115	199,494	56,089
Utica, Clinton & Binghamton	39,417	33,345	11,428
Total	\$1,418,568	\$523,517	\$94,255
Total, 1885	1,267,739	306,625	230,797

Increase or decrease... I. \$150,829 I. \$216,892 D. \$136,542
Per cent. of inc. or dec. 11.9 70.6 59.4

The deficit in each case is the excess of all interest and rental charges over the net earnings. All the lines except the Utica, Clinton & Binghamton show gains both in gross and net earnings over last year. The Utica, Clinton & Binghamton has been transferred to the New York, Ontario & Western Co. since the end of the quarter.

Detroit, Mackinac & Marquette.—It is reported that this company has made arrangements for the immediate construction of the extension of its road to the Sault Ste. Marie, and has also made an agreement with the Canadian Pacific, under which that company's Algoma Branch will be extended to the Sault in time to meet this road.

Dubuque & Northwestern.—The track on this road is now completed to Elma, Ia., 50 miles from the starting point at Hayfield on the Minnesota & Northwestern road. The new line is now being ballasted, and this division will probably be opened for business about the close of the present month. The work on the tracklaying is progressing steadily toward Dubuque.

Evansville & Terre Haute.—The locomotive firemen last week made a demand on the company for an increase of 25 per cent. in the wages. The company at once acceded to their demands, the increase to take effect from Aug. 1. The same increase is also given to the firemen of the controlled lines of the company.

Florida Midland.—Grading on this road is now reported as finished from Apopka, eastwardly to Lake Jessup, and work has been begun on the line from Lake Jessup south to Kissimmee. Track is laid for 6 miles from Apopka, and the work of putting down the rails is advancing steadily.

Gulf, Colorado & Santa Fe.—On the extension of the Dallas Branch of this road from Dallas, Tex., northeast to Paris, the grading is now nearly completed and track is reported laid for 24 miles, with work progressing steadily. On the extension from Fort Worth into the Indian territory work is advancing rapidly on the grading, and track-

laying will be pushed forward as soon as the bridges are completed.

Housatonic.—It is announced that the lease of the Danbury & Norwalk road, referred to last week, has been finally agreed upon by the directors of both companies and will be submitted to the stockholders for their approval. If ratified, as it probably will be, it will take effect from Oct. 1, the beginning of the next fiscal year. It is stated that this company will probably make extensive improvements at the terminal at Wilson's Point on Long Island Sound, and will straighten out the leased road at several points, and will use it as its main line for through traffic, the line from Brookfield Junction to Bridgeport being retained for local business.

Houston, East & West Texas.—A report was telegraphed from Houston, Tex., last week that negotiations were in progress for the sale of this road to the Southern Pacific Co. The road is of 3-ft. gauge and extends from Houston, Tex., to Shreveport, La., 240 miles. The officers of the Southern Pacific road, however, do not confirm this report, and say that they have no present intention of buying the road.

Illinois Central.—This company will extend the second track on its road to Kankakee, Ill., a double track to that point being made necessary by the business of the Cincinnati, Indianapolis, St. Louis & Chicago, which comes upon the Illinois Central at Kankakee. Under the new traffic agreement the trains of that road will be run through to Chicago with their own motive power. Heretofore they have been drawn from Kankakee by the engines of the Illinois Central.

Indiana, Bloomington & Western.—The report submitted to the Court by Receiver Henderson on the Cincinnati, Sandusky & Cleveland lease, says of the leased road:

"Many of the station buildings were old and dilapidated; turn-tables were, in the main, small, weak and out of repair; many of the bridges were decayed, and some of importance required early removal.

"The harbor at Sandusky was filled with mud so that vessels with any reasonable capacity could not reach the docks; the docks were insufficient in number, and in the main were rotten and decayed; water stations and buildings were old, decayed and entirely unfit for the purpose for which they were designed; trestles, cattle-guards and fences were decayed and dilapidated to an unusual degree.

"All of the main tracks were of old, and in the main worn out iron, except about 62½ miles, which were laid with light steel. The steel rail was in good condition. Much of the iron was light and had been in use over 20 years; there were numerous weights and patterns of rails, chairs, joints and fastenings. Side tracks were neither sufficient in number nor capacity, and were at many points out of repair. The yards at Columbus and Springfield were entirely inadequate for the business to be done.

"Many of the locomotives were of old and obsolete patterns and unfit for economical service; the passenger coaches were likewise out of date and poorly suited to first-class passenger service. The freight cars were not well adapted to a large and heavy freight business; nearly all of them were old and decayed and of small capacity, the average valuation whereof, as shown by the inventory, was only about \$40 per car above the then cash value of the old iron contained in them.

"Your Receiver further shows that the said lessors, for the period of five years next prior to the lease to the defendant railway company, received as net earnings from the roads operated by them, and from rents reserved on the road between Springfield and Dayton a total of \$1,171,193, or average annual net earnings of \$334,239, and during the said period the average expense of operating the said lines north and east of Springfield was 77.04 per cent. per annum.

"That the net annual amount paid to the lessors under the terms of said lease by the lessee for five years to March 31, 1886, after deducting rebates, etc., was \$1,544,704, an average of \$314,177 yearly, thus showing that the lessors have actually received, net, for the use of their roads during the period of the lease, an average annual sum of \$79,938.42 in excess of the average yearly net earnings derived by them for a like period prior thereto."

Kansas City & Pacific.—This company has filed articles of incorporation in Kansas to build a railroad from Kansas City to a connection with the Southern Pacific road at El Paso, Tex., with a branch to Albuquerque, N. M., to connect with the Atlantic & Pacific road. The estimated length of the road will be 1,400 miles, and the proposed line will parallel the Atchison, Topeka & Santa Fe, should it be built.

Long Beach.—Track is now laid on this road from the Junction with the Tuckeron Railroad at Menahawkin, N. J., southeast to Barnegat City, to Barnegat Bay, a distance of 13 miles. The road is controlled by the Pennsylvania Railroad Co., and will be operated as a branch of that company's line.

Long Island.—Surveys have been made for an extension of this company's Glen Cove Branch from the present terminus at Locust Valley, N. Y., eastward to the village of Oyster Bay, a distance of 5 miles. The extension will be built by a new corporation recently organized under the name of the Oyster Bay Extension Co., but it will be leased and operated by the Long Island Railroad Co.

Mexican Central.—The statement for June and the six months to June 30 is as follows:

	June.	1885.	Six months.	1885.
Earnings	\$274,764	\$278,770	\$1,633,263	\$1,880,096
Expenses	196,052	179,986	1,245,866	1,046,097
Net earnings	\$78,712	\$98,784	\$587,397	\$833,809

For the half-year the gross earnings decreased \$46,833, or 2.5 per cent., and the expenses increased \$199,769, or 19.0 per cent., the result being a decrease in net earnings of \$246,602, or 29.2 per cent. The increase in expenses was due to heavy renewals, especially of ties.

Mexican Railroad Notes.—The following notes are from the Mexican *Financier* of July 24:

The Department of Public Works has given to Mr. J. A. Verger a concession for building the Mexican Pacific Railroad from the city of Mexico to Cuernavaca, thence to Puente de Ixtla, and then on to a point of the Pacific Ocean between Acapulco and Manzanillo. The surveys must be begun within nine months from the date of the contract and construction must actually begin within a year, the line to be completed within 10 years. Construction must go on at the rate of 10 kilometres during the first two years, 30 kilometres during the third year, and thereafter 80 kilometres yearly till the road is completed. The guarantee deposit is \$20,000 in Mexican bonds. The company has the usual privileges regarding the importation of material.

In addition to previously given particulars regarding the modifications of the Mexican National concessions, it may be said that the government authorizes the company to build a new branch from a point on the main line, between Nuevo Laredo and Monterey, to the coal fields of the states of Coahuila and Nuevo Leon. The line to the coal fields may be

ramified as necessity demands within the coal region, with the approval of the Department of Public Works, it being mutually agreed that the government shall not be responsible for the payment of subsidy on more than 120 kilometres of new way. On all parts of the line construction must proceed with a degree of activity that shall insure the completion of the road and its branches within 10 years from the date of the new contract. During each two years, counting from the date of the contract, there shall be built at least 200 kilometres of way on that section of the line between San Miguel de Allende and Saltillo, and afterward at least 200 kilometres on all the other lines and branches belonging to the company taken together, and the company may, if it wishes, go on constructing its branches simultaneously with the work on its main line. The company may, should it become desirable, change the gauge of its line, or of its branches, to a broader one under certain restrictions as to interruption of travel, which are very liberal. The company receives ample privileges as to importation of material for construction, repairs and operation.

Middletown, Unionville & Water Gap.—This company has \$150,000 first-mortgage bonds which will mature Nov. 1 next. Holders are now offered the privilege of extending these bonds for 25 years at 5 per cent. interest, provided they accept the option by Oct. 1 next. The road is leased to the New York, Susquehanna & Western.

Milwaukee, Dexterville & Northern.—Track is now laid on this road from Dexterville, Wis., northwest to Cary, in Wood County, a distance of 12 miles. The company's purpose is to extend the road gradually until it reaches Lake Superior, but the lake terminus has not yet been decided on.

Missouri Pacific.—The branch of the Nebraska Division from Weeping Water, Neb., westward to Lincoln is now nearly finished, the grading being substantially done and 30 miles of track laid. Work is also in progress on the station in Lincoln. The new branch will be 35 miles long and has required some heavy cutting and filling.

The branch of the Missouri, Kansas & Texas Division, which was recently completed from Nevada, Mo., southwest to Minden, 32½ miles, is now extended to Chetopa, Kan., 31½ miles beyond Minden and 74 miles from Nevada. Trains begin running over this extension this week. The new line makes a loop line to the Missouri, Kansas & Texas Division, 19 miles shorter than the old road, and also passes through a country rich in coal, and a number of mines will shortly be in operation along the line.

Nashville, Chattanooga & St. Louis.—This company has submitted a proposition to the Tennessee Coal, Iron & Railroad Co. for the purchase of that company's railroad, which runs from Cowan, Tenn., to Tracy City, 20 miles. If the purchase is arranged, as it probably will be, the Tennessee Coal & Iron Co. will give up its railroad operation altogether and devote its entire attention to the mining and iron departments of its business.

A proposition is also under consideration for building an extension of the Lebanon branch from Lebanon, Tenn., to a point in Putnam County. In connection with this plan is also under consideration for aiding the construction of the projected Middle & East Tennessee Central road.

New York Central & Hudson River.—The new Genesee Falls Branch in Rochester, N. Y., is now nearly completed and will probably be in use next week. This branch is about 1 mile long and will be used for freight purposes only. It is intended to connect the main line with two or three large breweries and some other manufacturing establishments.

New York, Chicago & St. Louis.—The Receiver's statement for the quarter ending June 30 is as follows:

	1886.	1885.	Increase.	P. c.
Earnings.....	\$784,072	\$683,963	\$100,709	14.8
Expenses.....	552,197	544,782	7,415	1.3
Net earnings.....	\$232,475	\$139,281	\$93,294	66.6
Charges.....	107,125	104,778	2,347	2.2
Balance.....	\$125,350	\$34,403	\$90,947	264.1

Charges include rentals, car trusts and taxes, but not interest on the funded debt.

New York & New England.—The statement for June and the nine months of the fiscal year from Oct. 1 to June 30 is as follows:

	June.	Nine months.
Earnings.....	\$314,317	\$271,657
Expenses.....	217,797	189,794
Net earn.....	\$96,520	\$81,263

For the nine months the gross earnings increased \$488,759, or 19.0 per cent., and the expenses \$137,222, or 8.3 per cent., leaving a gain of \$301,537, or 45.5 per cent., in net earnings.

New York, New Haven & Hartford.—The report to the New York Commission for the quarter ending June 30 is as follows:

	1886.	1885.	Increase.	P. c.
Earnings.....	\$1,859,826	\$1,664,362	\$195,464	11.8
Expenses.....	1,201,447	1,011,007	190,440	18.9
Net earnings.....	\$658,379	\$653,355	\$5,025	0.8
Charges.....	204,947	204,947	.....	.....
Surplus.....	\$453,432	\$448,408	\$5,024	1.1

The surplus for the quarter was equivalent to 2.92 per cent. on the stock, against 2.89 per cent. last year.

Norfolk & Western.—A statement issued by this company gives the traffic of the road for the half-year to June 30 as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Pass. train miles..	211,713	272,974	I. 38,739	14
Freight ".....	1,155,392	1,068,502	I. 146,890	15
Pass. carried.....	157,834	159,221	D. 1,387	1
Passenger-miles..	7,557,772	8,110,098	D. 552,326	7
Tons freight car..	688,813	547,740	I. 142,073	26
Ton-miles.....	181,629,586	139,787,328	I. 47,842,258	36

The increase in local passenger traffic was 4 per cent.; the decrease in through, 34 per cent. In freight traffic the increase was 43 per cent. in local business and 14 in through. Of the total freight traffic 79 per cent. was local. Passenger earnings decreased 2 per cent. and freight earnings increased 23 per cent.

A statement of earnings and expenses for the half year is as follows:

	Earnings.	Expenses.	Net earnings.
January.....	\$218,907	\$141,240	\$77,667
February.....	211,788	137,457	74,331
March.....	277,307	156,375	120,932
April.....	267,538	158,159	109,399
May.....	235,701	147,338	88,363
June.....	228,127	142,723	85,404
Total, 6 mos.....	\$1,449,388	\$883,292	\$566,096
Six mos., 1885.....	1,237,030	791,337	445,693
Increase.....	\$212,358	\$91,955	\$120,403
Per cent.....	17	14	27

Expenses include taxes. For the six months of this year the earnings were \$2,842 gross and \$1,110 net per mile. The expenses were 61 per cent. of gross earnings, against 64 per cent. last year.

Northern Pacific.—The statement for June and the fiscal year ending June 30 is as follows:

	June.	Year.
Earnings.....	\$1,077,316	\$1,012,507
Expenses.....	518,072	447,021
Net earnings.....	\$559,244	\$565,486

For the year the gross earnings increased \$496,378, or 4.4 per cent., and the expenses decreased \$34,501, or 0.6 per cent., the result being a gain of \$530,879, or 10.1 per cent., in net earnings. Land sales for the year were \$70,925 acres, for \$1,376,844. The funded debt of the company at the close of the year is \$72,877,321, and the amount of bonds purchased for the sinking fund was \$431,500. The amount of preferred stock outstanding was reduced \$92,630 in June, and it now is \$38,058,310.

Ohio Central, River Division.—The Reorganization Committee announces that bondholders and stockholders who have assented to the reorganization will receive the new securities upon presentation and surrender of the trust company's certificates and certificates of stock held by them at the office of the Central Trust Co., in New York, on and after Aug. 10. The final installment of 7 per cent. upon the income bonds will be due on that date.

Oregon Railway & Navigation Co.—The continued postponement of the election of directors of this company gives some color to the reports that negotiations are in progress for a sale of a large interest in the stock to the Union Pacific Co. The postponement, it is said, has been continued in to permit the completion of negotiations, and in order that the Union Pacific may be represented in the new board, should the sale be effected. The stock over which negotiations are in progress is the large block owned by the Oregon & Transcontinental Co., and which constitutes a majority of the whole.

The gross and net earnings for June, and for the fiscal year ended June 30, were as follows:

	June.	Year.
Gross earnings.....	\$481,735	\$382,782
Operating expenses..	241,721	198,930
Net earnings.....	\$240,014	\$183,852

For the year the gross earnings increased \$1,464,421, or 35.9 per cent., and the expenses \$469,449, or 18.7 per cent., leaving a gain of \$994,972, or 63.3 per cent., in net earnings.

Philadelphia & Reading.—At the hearing in the Robinson foreclosure suit in Philadelphia, July 31, President Gowen created some sensation by offering to prove a conspiracy between the Pennsylvania Railroad Co. and other corporations in the institution of this suit, the object being to prevent the completion of the South Pennsylvania Railroad, to obstruct the Baltimore & Ohio and to break up the Reading property. Mr. Gowen further offered to show that in the hands of the Receivers the Reading had earned the interest on the general mortgage bonds and that a suit for foreclosure of that mortgage was therefore not tenable. Council for the plaintiff object to receive this testimony. The Court took the matter under consideration and announced that argument would be heard some time during the present week.

The announcement made by Mr. Gowen is really nothing new, but the question is whether he can submit proof of anything amounting to a conspiracy in view of the law. The present object in conducting this suit seems to be to employ every conceivable expedient to secure delay.

Piedmont & Cumberland.—This company, which was recently organized to build the extension of the West Virginia Central & Pittsburgh road from Piedmont, W. Va., to Cumberland, has executed a mortgage to secure an issue of \$650,000 in 5 per cent. bonds to pay the cost of building the road, which will be about 31 miles long. In connection with the issue of these bonds, it is announced that a traffic contract has been made under which the Pennsylvania Railroad Co. agrees to set aside 5 per cent. of its gross receipts on all freight traffic received from the new road, and the West Virginia Central & Pittsburgh on their part agree to give at least one-half of the coal traffic from the road to the Pennsylvania.

Pullman's Palace Car Co.—The repair shops at Elmira, N. Y., which this company has for some years past leased from the Erie Railroad, will shortly be vacated and turned over to that company. It is understood that all the repair work of the Pullman line in the East is to be centred in one large shop. The location of that establishment is not yet decided on.

St. Joseph & Grand Island.—Surveys have been made for a branch from Fairfield, Neb., to Sutton, and work will shortly be begun. The branch will be about 30 miles long.

St. Louis, Fort Scott & Wichita.—The Wichita & Colorado Branch of this road is now completed and opened for business to Elmer, Kan., 4 miles from Wichita and 9 miles beyond the latter terminus at Haven. Trains are running through to the new terminus.

St. Louis, Kansas City & Colorado.—The United States Circuit Court has denied the application of this company for a peremptory order to compel the Wabash Receivers to allow its trains to run over the Wabash tracks to the Union Depot in St. Louis. The Court holds, first, that the petitioner has not as yet constructed its road to the boundary line of Forest Park, the point at which the alleged contract right to use the Wabash tracks begins. Second, the Court holds that it is not necessary to direct the Receivers to allow the complainants to use the Wabash tracks beyond Forest Park as has been suggested. It is not charged that the Receivers have failed to perform their duties as common carriers, or that they have refused to carry business brought to them by the plaintiff. Third, the Court holds that the plaintiff has a claim to have its contract right determined in the present proceeding. If it should be decided that it has no use to the Wabash tracks, it will be compelled to build another line into St. Louis at a great expense, and justice requires that its rights in the case be determined as soon as possible. The Court, however, does not think that the somewhat unusual proceeding of a mandatory injunction is required in this case. The intervening petition takes the place of an ordinary bill, but there should be a full hearing upon the question of right before any order is made to enforce the contract. The question, the Court holds, is somewhat involved, and there is considerable doubt as to the rights of complainant, which further testimony will be necessary to clear up. The Court therefore, while refusing the injunction, refers the case back to the Master, with the directions that the Wabash Co., the Receivers and the trustees be notified to answer within 15 days; that either

party be allowed to offer additional testimony, and that the Master report the case back to the Court by Sept. 8 next, in order that it may be heard at the September term.

Savannah & Tybee.—This company has been organized at Savannah, Ga., to build a railroad from that city to Tybee Island. The line will start from Randolph street in Savannah and will run through Deptford and along the south side of the Savannah River to the present steamboat landing on Tybee Island, a distance of 15 miles. The company has also arranged to acquire the railroad now in existence across the island, which is about 3 miles long, and which will make the total distance from Savannah to the ocean 18 miles. It will be intended, of course, chiefly for pleasure excursion travel, and in connection with this road the company purposes making extensive improvements on the island.

A contract to build and equip the road has been let to Mr. Thomas B. Inness, of New York, who agrees to begin work by Oct. 1 and to complete the road by April 1, 1887, in time for next season's business.

Savannah Valley.—Track on this road is reported laid to Stony Point, S. C., 48½ miles northwest from the starting point at McCormack, which is on the Augusta & Knoxville road, 43 miles from Augusta. About 10 miles remains to be laid to complete the road to Anderson.

Southern Pacific.—The San Francisco *Bulletin* says: "Two new maps have been filed in the United States Land Office in this city, each showing a section of 20 miles of the route of the Southern Pacific Railroad extension below Soledad. The maps are a surprise to all but the initiated. The route that they describe commences some miles north of San Miguel and runs along the Salinas River to a point opposite that village; thence following the Estrella River southeasterly, passing the old Cholame grant and valley (owned by R. E. Jack, the San Luis Obispo banker, and others), and ending at a point just over the Kern County line. This entirely avoids Paso Robles Springs, which was contesting with San Miguel the honor of becoming the city of that region. These maps indicate that the road will be pushed easterly to the great trunk line at Bakersfield, and that another road will be run up from Newhall or San Fernando to join this extension at a point east of San Miguel. The maps only describe the right of way pursuant to Act of Congress."

Southern Pacific Co.—The gross and net earnings of the roads in the Atlantic System in detail for May were as follows:

	Gross earnings.		Net earnings.	
	1886.	1885.	1886.	1885.
Gal. Har. & S. A.....	\$191,471	\$250,522	\$18,713	\$119,413
G. W. Tex. & Pac.....	3,507	5,944	1,373	5,008
Louisiana Western.....	46,550	44,770	18,070	21,934
Morgan's La. & Tex.....	276,738	293,932	34,355	78,849
N. Y. Tex. & Mex.....	11,430	23,500	1,558	7,000
Texas & New Orleans..	63,004	75,702	17,933	32,760
Total.....	\$502,700	\$694,330	\$18,715	\$209,418

* Deficit.

The total decrease in gross earnings was \$101,630, or 14.6 per cent.; in net earnings, \$210,733, or 81.3 per cent. This result was due in part to low rates and in part to decreased traffic.

Syracuse & South Bay.—This company has filed articles of incorporation to build a railroad from Syracuse, N. Y., east by north to South Bay, at the east end of Oneida Lake. The road will be about 25 miles long, and will skirt along the south shore of Oneida Lake.

Texas & Pacific.—A third plan of reorganization for this company has been prepared by the stockholders' committee and is now presented to holders of securities for their approval. A summary of the essential features of this new plan is as follows:

"The issue of a 50-year general mortgage for \$32,000,000, class A to bear 5 per cent. for five years and 6 per cent. thereafter; class B 4 per cent. and class C 3 per cent. The Eastern Division bonds are to be exchanged dollar for dollar for class A bonds at 5 per cent. and 20 per cent. in first-mortgage income bonds, or dollar for dollar to bear 5 per cent. for five years and 6 per cent. thereafter, unpaid coupons to Dec. 1, 1885, to be funded in the class A bonds. New Orleans Pacific bonds are to be exchanged for class B bonds and coupons to July 1, 1885, to be funded in second-mortgage income bonds. Rio Grande bonds are to take class C bonds and the coupons to Aug. 1, 1885, to be funded in second-mortgage income bonds. Terminals are to be exchanged for second-mortgage income bonds. Floating debt to be paid from proceeds of \$2,935,800 class A bonds left over; that is, such of the floating debt as must be paid. New Orleans and Rio scrip is to be funded in second-mortgage income bonds. New stock to be issued for the present, dollar for dollar, to those who pay \$5 assessment. The second-mortgage incomes shall be for \$6,000,000 3 per cent., if earned for three years, and 3 per cent. absolutely thereafter. Annual charges under this plan will be \$1,541,786 after three years."

It is stated that members of the New York or Rio Grande bondholders' committee are at work arranging some modifications of their plans, which are intended to meet the objection made by the stockholders' committee, and that an attempt will be made to harmonize the differences and to unite on one plan all holders of securities who are opposed to the plan prepared by the Wistar committee. Such a union would undoubtedly give increased strength to the opposition and make the success of the plan of reorganization very probable.

The Philadelphia *Ledger* of July 31 says: "The Wistar Reorganization Committee of the Texas & Pacific Railroad held a long and friendly consultation yesterday with Mr. Robert Fleming, who represents the Scotch creditors. While nothing was finally agreed upon, and the Chairman so announced, the probability continues to increase that these interests will ultimately come together and amicably reorganize the property, through modifications of the existing plans that will be acceptable to all."

Toledo, Ann Arbor & North Michigan.—This company has now completed its Northern Division to Mt. Pleasant, Mich., 21 miles beyond the late terminus at St. Louis and 63 miles from the Southern terminus of the division at Owosso. Regular trains are running to the new terminus.

Toledo, Columbus & Southern.—A suit has been begun in Toledo by New York parties who held claims amounting to about \$200,000 against the old Toledo & Indianapolis Co., which were cut off by the foreclosure sale under which the road was transferred to the present company. In this suit the plaintiffs claim that the stock issued by the old company was not paid for by the subscribers, as required by law, and they therefore ask that the Court order the subscribers to pay up their subscriptions, and that they may have judgments against the subscribers individually. The suit affects a number of persons, most of whom are owners in the new company.

Toledo, Peoria & Western.—In the United States Circuit Court in Chicago, July 30, a final decree of foreclosure was ordered to be entered in the suit brought by the trustees to foreclose the first mortgage for \$4,500,000. The decree finds that there is now due for principal and interest on the bonds issued under this mortgage the sum of \$5,154,729, and directs that the road be sold to satisfy this debt on Oct. 29

next, Mr. Henry W. Bishop being appointed Special Master to make the sale. The sale will be made subject to \$750,000, a prior lien on the part of the road under a mortgage dated in 1857, but it is stated that this has been mostly provided for. In addition to the first mortgage there are \$3,900,000 income bonds on the road which will be extinguished by the foreclosure.

The road extends from State Line, Ill., to Warsaw, 227 miles, with a branch of 20 miles to Burlington, Ia., and a connection across the Keokuk bridge over the Mississippi. It was formerly the Toledo, Peoria & Warsaw road, and was reorganized under foreclosure some six years ago and subsequently transferred to the Wabash, St. Louis & Pacific road. That company having made default on the interest, the trustees commenced foreclosure proceedings last year, and the Court ordered the appointment of a separate receiver and the separation of the road from the Wabash system. There are still a number of claims against the Wabash Co. in litigation by the trustees. The first-mortgage bondholders have made arrangements to reorganize the company.

Union Pacific.—The following notice from General Manager S. R. Callaway is dated Omaha, July 20:

"That portion of the Utah & Northern Railway lying north of Silver Bow Junction, and of the Montana Railway northwest from Stuart Junction has been leased to the Montana Union Railway, and will be operated by that company on and after Aug. 1, next.

"The passenger trains of this company will continue to run to and from Butte over the line of the Montana Union, and will connect at Silver Bow Junction for trains for Garrison, Deer Lodge, Anaconda, and all other points upon the line of that railway."

The statement for June and the six months to June 30 is as follows:

	June, 1886.	1885.	Six months, 1886.	1885.
Earnings	\$2,263,822	\$1,955,396	\$11,006,088	\$11,221,540
Expenses	1,734,525	1,554,916	8,444,765	7,949,842

Net earnings, \$529,297 \$400,480 \$3,161,323 \$3,271,698

For the half-year the gross earnings increased \$381,558, or 3.4 per cent., and the expenses \$494,923, or 6.2 per cent., the result being a decrease of \$123,365, or 3.8 per cent., in net earnings. Taxes are included in expenses.

Verdigris Valley, Independence & Western.—This road has been completed and opened for business from Leroy, Kan., on the Kansas & Arizona Division of the Missouri Pacific, westward to Yates Centre, a distance of 16½ miles. The road is controlled by the Missouri Pacific and will be operated as a branch of that line.

Wabash, St. Louis & Pacific.—The Purchasing Committee paid the balance of the \$625,000 purchase money, bid at the foreclosure sale, into bank in St. Louis on July 31, in pursuance of the order of the Court. The committee, however, has not yet complied with the further requirements of the court in relation to providing for the receiver's certificates and other claims which the court said must be paid or provided for before the sale could be finally approved.

The Purchasing Committee estimates that to meet these prior claims, payment on which the Court requires, will take about \$3,500,000, and even should no opposition be made to the plan presented to the bondholders, it will be impossible to complete the reorganization and take possession of the road before the close of the present year. The payment of the purchase money into court, as noted above, is intended to make good the Committee's title and to prevent an order for the re-sale of the road. From the present attitude of a number of prior lien bondholders, however, it is evident that the Purchasing Committee's proposition will not be successful. It is said, however, that the bondholders' committee is willing to negotiate, and it is not impossible that some compromise may be effected.

Washington & Idaho.—This company has filed articles of incorporation to build a railroad from Farmington, Wash., to Lake Coeur d'Alene, Idaho, and thence to some point on the Northern Pacific, probably Spokane Falls. It is intended to reach the Coeur d'Alene mining district by a direct line. Surveys of the projected line are to be made at once.

West Jersey.—This company's statement for June and the six months to June 30 is as follows:

	June, 1886.	1885.	Six months, 1886.	1885.
Earnings	\$115,380	\$111,648	\$545,638	\$510,793
Expenses	68,818	61,892	368,991	325,912

Net earnings, \$46,562 \$49,156 \$176,647 \$184,881

Interest, rentals, etc. 130,589 123,167

Net surplus \$46,058 \$61,714

For the half-year the gross earnings increased \$34,845, or 6.8 per cent., and the expenses \$43,079, or 13.2 per cent., leaving a decrease in net earnings of \$8,234, or 4.4 per cent. The charges show an increase of \$7,422, or 6.0 per cent., leaving a decrease of \$15,656, or 25.2 per cent., in net surplus.

The leased West Jersey & Atlantic road (included above) earned for the half-year \$77,555; the expenses were \$56,230 and the net earnings \$21,325, an increase of \$7,308, or 52.2 per cent., over last year.

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Col., Hocking Vv. & Tol..... 192, 360	Pittsburgh, Cin. & St. L..... 98
Concord..... 367	Pittsburgh Junction..... 98
Connecticut River..... 85	Pitts., N. E. & Youngsberry..... 98
Consolidation Coal Co..... 139	Pitts., Wheeling & Ky..... 98
Cum-b-rland Valley..... 507	Portland & Ogdensburg..... 120
Del. & Hudson Canal Co..... 258	Providence & Worcester..... 120
Del., Lacka. & Western..... 104, 158	Rochester & Pittsburgh..... 98
Denver & Rio Grande..... 139, 536	Richmond & Allegheny..... 86
Des Moines & Fort Dodge..... 291	Richmond & Danville..... 85
Detroit, Lansing & No..... 323	Richmond, Fred. & Potomac..... 86
Detroit, Gd. Haven & Mil..... 324, 518	Rochester & Pittsburgh..... 98
Dublin & Wrightsville..... 255	Rome, Wat. & Ogdensburg..... 98
Fitchburg..... 68	Rutland..... 403
Fort Wayne, Cin. & Louis..... 307	St. L. Iron Mt. & So..... 207
Fremont, Elkhorn & Mo. Vv..... 530	St. L. & San Francisco..... 343, 360
Galveston, Houston & Hen..... 367	St. L., Van. & Terre Haute..... 292
Georgia Pacific..... 272	St. Paul & Duluth..... 155
Grand Trunk..... 324	Savannah, Fla. & Western..... 344
Huntingdon & Broad Top Mt..... 120	St. Paul City & Pacific..... 256
Illinois Central..... 174	South Carolina..... 238, 308
Indianapolis & St. Louis..... 208	Southern Pacific Co..... 470
International & Gt. No..... 367	Stewartstown..... 303
Iron..... 493	Terre Haute & Indianapolis..... 470
Kans. City, Ft. Scott & Gulf..... 436	Terre Haute & Logansport..... 470
Kans. City, Springfield & Mem..... 485	Troy & Greenfield..... 224
Kansas City Union Depot Co..... 256	Union Pacific..... 239
Lake Shore & Mich. So..... 314	Utica & Black River..... 86
Lehigh Coal & Navigation Co..... 140	Vicksburg, Shreveport & P..... 423
Lehigh Valley..... 68, 224	Virginia Midland..... 139
Leh. & Wilkes-Barre Coal Co..... 139	Western Maryland..... 139
Little Miami..... 394	Western North Carolina..... 104
Louisville, N. Albany & Chi..... 255	Wilmington, Col. & Augusta..... 104
	Wilmington & Weldon..... 104
	Worcester, Nashua & Roch..... 104
	Wrightsville & Tennille..... 256

Wisconsin Central.

This road includes the following lines, which are operated by trustees for the bondholders, pending the corporate and financial reorganization of the company, which is not yet complete:

Menasha, Wis., to Ashland, on Lake Superior..... 253.3
Stevens Point, Wis., to Portage..... 71.7
Short trunk branches..... 21.0

Total owned..... 346.0

Packwaukee & Montello, leased..... 96.0

Milwaukee & Lake Winnebago, leased..... 104.0

Total worked..... 450.0

A line from Abbotsford, Wis., to St. Paul, Minn., is operated in the interest of the road, and a line from Schleisingerville, Wis., to Chicago, has just been completed, but those roads are owned by allied corporations and are operated under separate organizations. They are not included in the Trustees' seventh report, for the year ending Dec. 31 last.

The equipment includes 47 locomotives; 30 passenger, 5 chair, 2 combination and 17 baggage, mail and express cars; 94 box, 20 stock, 768 flat and 26 caboose cars; 1 pay car, 1 business car, 2 boarding cars, 3 pile drivers and 3 snow-plows. Of this equipment there are leased 23 locomotives; 17 passenger, 5 chair, 2 combination and 13 baggage cars; 759 box, 495 flat and four caboose cars.

The Land Department reports for 1885 sales of 11,260 acres of land for \$27,015; 329 town lots for \$15,035 and 125,695 M. stumpage for \$149,950. The total land grant was \$31,700 acres, from which 160,565 have been sold. The assets include 671,135 acres unsold and \$110,125 in land notes and contracts.

The company's line crosses the Penokee Iron Range, but no mines have been opened near its line. Several licenses have been granted to explore for mineral on the lands owned by the company.

The earnings for the year were as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Freight.....	\$986,258	\$916,263	I.	69.995
Passengers.....	380,896	435,746	D.	54.850
Mail and express.....	62,942	51,245	I.	11.697
Other.....	30,909	25,281	I.	5.088

Total.....\$1,461,005 \$1,407,535

Expenses.....941,881 957,745

Net earnings.....\$519,124 \$471,330

Gross earn. per mile.....3.247 3.176

Net.....1.154 1.047

Per cent. of exps.....64.5 67.0

The increase in earnings was small, owing to a decrease in passenger traffic and to a considerable reduction in the rates received on a largely increased freight traffic.

The expenses for the year were divided as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Operating road.....	\$438,809	\$446,466	D.	31.2
Maintenance of road.....	216,111	249,277	D.	17.5
Equipment.....	157,211	136,351	I.	9.5
General expenses.....	102,505	96,957	I.	6.8
Miscellaneous.....	27,245	28,694	D.	2.0

Total.....\$941,881 957,745

Expenses do not include taxes, which were last year \$55,333, or 3.8 per cent. of gross earnings. Renewals included 1,795 tons of steel rails and 81,202 ties.

Of the gross earnings the Wisconsin Central lines furnished \$1,030,421 (\$2,911 per mile) and the Milwaukee & Lake Winnebago road \$437,584 (\$4,485 per mile).

The trustees' revenue account is as follows:

Net earnings, as above.....	\$519,124
Rentals of leased lines.....	\$210,032
Car service, balance.....	45,042
License fee and taxes.....	55,333
	310,407

Balance.....\$208,717

Less sundry expenses.....\$17,130

Interest on bonded debt paid.....226,000

Balance, due sundry parties.....\$34,413

Expenditures during the year for construction amounted to \$53,850; equipment, \$9,323; total, \$63,173. The chief items of construction were for new ballasting of tracks and for fencing.

The traffic for the year was as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Passenger train miles.....	516,441	524,224	D.	4.783
Freight.....	442,350	435,746	I.	6.789
Total loco. miles.....	1,285,992	1,284,707	I.	21.953
Passenger car miles.....	2,279,572	.....	.....	.....
Freight.....	9,945,980	.....	.....	.....
Passengers carried.....	297,093	341,824	D.	44.731
Passenger miles.....	13,219,790	14,613,556	D.	1,393,766
Tons freight carried.....	547,240	444,849	I.	102,391
Ton-miles.....	55,707,206	43,338,991	I.	12,368,215

Passengers, No.....254 279

Freight, tons.....125.9 99.3

Average rate.....2.88 cts. 2.98 cts.

Per passenger mile.....1.77 1.77

Per ton-mile.....1.77 1.77

Of the freight car mileage last year 71.8 per cent. was of loaded cars. Locomotives ran 1.34 miles to each revenue train mile. The average passenger journey was 44.5 miles; the average freight haul, 101.7 miles.

The Agent for the trustees says that the year was one of great depression in the general railroad traffic of the state. The amount of business done over the road was larger than ever before, but the rates paid were so much lower that, notwithstanding the increase in the amount of traffic and the

new business acquired by new connections, the road was unable to show much increase in gross earnings. The completion of the Minnesota, St. Croix & Wisconsin Railroad in 1885, which gave access to St. Paul and Minneapolis and the railroads connecting there, proved to be of little advantage, because such action was taken by the Chicago, Milwaukee & St. Paul Railroad Co. as prevented the St. Croix line from making any connections over their track with Milwaukee and Chicago, and made it temporarily impossible to do business between those important cities and St. Paul.

The report refers to the new Chicago line as follows: "In August last the construction of the Chicago, Wisconsin & Minnesota Railroad from Schleisingerville to Chicago was therefore begun. This road will this summer be completed for operation. The Wisconsin Central Railroad, between Abbotsford and Neenah, and the Milwaukee & Lake Winnebago Railroad, then become parts of a through line for freight and passengers between Chicago, St. Paul and Minneapolis, and all the railroads terminating in those cities respectively. The other corporations comprising this line are willing to co-operate with and are entirely friendly to the Wisconsin Central road.

"The Chicago, Wisconsin & Minnesota Railroad is leased for 99 years to the Wisconsin & Minnesota Railroad Co. The trustees will receive business from the Wisconsin & Minnesota Railroad at Abbotsford, its terminus, and deliver it at Schleisingerville to the lessee of the new line. Existing contracts made it impossible for the Wisconsin Central Co., and the trustees, or either of them, to accept a lease of the new line from Schleisingerville to Chicago. This extension of Wisconsin Central business connections and conversion of its track into part of a new trunk line between Chicago, St. Paul and Ashland and the Pacific Ocean, has been obtained without any expense, or the assumption of any liabilities by the trustees.

"During the past year popular rumor has called this new line to Chicago an extension of the Wisconsin Central Railroad, and assumed that the terminal facilities which the Chicago & Great Western Railroad Co. furnish in Chicago, belonged to the Wisconsin Central Railroad Co. This rumor, it is hardly necessary to say, is entirely incorrect. Neither the trustees nor the Wisconsin Central Railroad Co. have any ownership or control of any track lying beyond Schleisingerville on the south, or Abbotsford on the west. They will doubtless derive, without expense on their part, a great advantage from the fact of this construction to Chicago, and it becomes manifestly the interest of the trustees and the Wisconsin Central Railroad Co. to co-operate harmoniously with the other corporations which own and control the rest of the new trunk line between Chicago and St. Paul, and comprise the Wisconsin Central Associated Lines, so called, and for which association the Chicago & Great Western Railroad Co. is preparing to furnish terminal accommodations in Chicago.

"These corporations, namely: Chicago, Wisconsin & Minnesota; Milwaukee & Lake Winnebago; Wisconsin Central; Wisconsin & Minnesota; Milwaukee, St. Croix & Wisconsin, in order to assist the Chicago & Great Western Railroad Co. in completing its terminal system and selling its bonds, have joined in a guarantee of the interest on \$4,000,000 of its first-mortgage terminal bonds, and have agreed to become its first tenant.

"The Wisconsin Central property is in excellent physical condition, and the trustees are gradually replacing with steel rails the iron rails which are now wearing out. * * * Under the agreement between the trustees and the Milwaukee & Lake Winnebago Co., it is provided that at any time when new, permanent improvements and additions upon the leased road shall become necessary, and shall be jointly agreed upon between the lessees and the Milwaukee & Lake Winnebago Co., the last named company shall issue its 20-year debentures, bearing 6 per cent. interest, in payment for their construction, and the interest upon said debentures shall be paid by the lessees during the first 10 years. It became necessary for this company to construct a bridge across the river at Oshkosh, as a condition precedent to its entering the Wisconsin Central Associated Lines, and in order to pay for the same the Milwaukee & Lake Winnebago Co. has issued its debentures to the amount of \$100,000. That company had previously issued in 1884 the same amount for various permanent additions and improvements."

Oregon & Transcontinental Co.

Mr. Elijah Smith, President of this company, has issued a report to the stockholders, which is given below, substantially in full:

The assets have decreased 5,879 shares Oregon Railway & Navigation stock, 33,920 shares Northern Pacific preferred stock, 32,868 shares Northern Pacific common stock, 5,200 shares Wisconsin Central stock, \$1,170,000 of Oregon & California second mortgage bonds. Of these 5,879 shares of the Oregon Railway & Navigation stock, 30,220 shares of the Northern Pacific preferred, and 27,268 shares of common stock were taken by the holders of the notes dated Dec. 31, 1884, which were issued to the amount of \$7,500,000, and were secured by a pledge of 105,000 shares Oregon Railway & Navigation stock at 50, 60,000 shares Northern Pacific company stocks, preferred, at 25, and 60,000 shares Northern Pacific common at 12½, which notes gave options to the holders to take Oregon Railway & Navigation stock at par, Northern Pacific railroad preferred at 50, and Northern Pacific common at 25, to the extent of one-half of the amount of each stock pledged as collateral to secure said notes. Three hundred shares of Oregon Railway & Navigation stock, 3,700 shares of Northern Pacific preferred and 5,600 shares of Northern Pacific Railroad common were sold by Kuhn, Loeb & Co., against whom a suit has been brought for selling the stock illegally; 5,200 shares of Wisconsin Central were sold in December, 1885, realizing the sum of \$99,575. The \$1,170,000 Oregon & California second mortgage bonds were increased by the taking the \$800,000 from the syndicate that took the \$8,000,000 Oregon & Transcontinental loan of Dec. 31, 1883, to whom they were given as a commission, with an agreement to purchase them at the maturity of the loan at 50 per cent. of their face value, say, \$400,000; and also by the further acquisition by purchase of \$230,000 of the bonds at 20 per cent. of their face value, say, \$46,000, which was necessary to enable this company to control the whole issue of second mortgage bonds outstanding of the Oregon & California Railroad Co. This gave the Oregon & Transcontinental Co. \$2,200,000 of the bonds, which, under an agreement with the said Oregon & California Railroad Co., the Oregon & Transcontinental Co. had obligated itself to deliver to the Oregon & California Railroad Co. for the complete abrogation of the lease and construction contract, entered into between the Oregon & Transcontinental Co. and the Oregon & California Co., dated May 25, 1883, and a full and complete settlement of all the accounts, matters and differences between this company and the Oregon & California, and the surrender and delivery of the Oregon & California road and property leased by the Oregon & Transcontinental Co. The Oregon & California Co. obligated itself to pay \$446,000 for the said \$2,200,000 of bonds on or before Jan. 1, 1885, and to pay all of the obligations of the Oregon & Transcontinental Co. incurred under said lease and construction contract. The Oregon & Transcontinental Co. released all claim for further delivery of either first or second mortgage bonds for com-

pleted mileage. The \$446,000 were not paid as agreed, and the Oregon & Transcontinental Co. took steps to foreclose the second-mortgage bonds. After considerable delay and litigation the matter was settled, and the Oregon & Transcontinental Co. received the \$446,000 and interest, \$20,367, Oct. 6, 1885, which amounted in all to \$466,367. As the result of the lease of the Oregon & California Railroad Co. to this company was an absolute loss of about \$1,200,000 in a period of about 14 months, and as it has since 1885 been in the hands of a Receiver, and has not paid any interest on its first-mortgage bonds, it may be considered a great relief to this company to have got rid of the burdensome lease, which involved an annual payment of \$810,000 up to the time of the completion of the road to the California state line, beside raising some \$2,000,000 to complete the construction of the road contemplated in the lease, and an estimated amount of fixed charges of \$1,134,400 after its completion. The Oregon & California Railroad Co. has not yet paid all the debts it assumed under the agreement of Aug. 1, 1884, and there is due from them about \$65,015.56, which there is a prospect of receiving at an early date.

The assets of the company have been increased as follows: 9,268 shares of Oregon Improvement Co. stock, 1,050 shares of Central & South American Telegraph Co. stock, \$112,000 Mexican Central Railway Co. first mortgage bonds, \$25,000 Mexican Central income 3 per cent. bonds, \$142,000 Oregon & Transcontinental Co. bonds, \$170,000 claims against individuals.

The Oregon Improvement stock, the Central & South American Telegraph stock, the Mexican Central bonds, \$24,000 of the Oregon & Transcontinental 6 per cent. bonds, and \$170,000 claims against individuals were received in January, 1886, in the settlement of the account standing on the books of this company against Henry Villard, this company paying to Drexel, Morgan & Co. about \$125,000, and taking up and becoming the owners of the above securities, and in addition, \$10,000 of the Northern Pacific Terminal Co. bonds, which were disposed of at 108%. This settlement, after considerable negotiation, it was thought desirable to make. The Oregon & Transcontinental Co. bonds, outside of the \$24,000 received in the settlement of Mr. Villard's account, are a balance of the bonds received for the completion of the construction of the Jamestown & Northern Railroad. In the statement contained in the circular of Nov. 11, 1884, will be found an item of \$95,000 which had been expended on the extension of that branch, for which the company had nothing to represent. The company completed the branch, 25½ miles, and received \$510,000 of first-mortgage bonds, which have been disposed of, except the \$142,000 still on hand, and not only cashed the \$95,000 asset, but realized a profit of about \$123,000 in addition from the operation.

The net debt of the company on June 1 last was \$7,623,400, a decrease since the statement of Nov. 11, 1884, of \$2,756,600. Of the debt, the sum of \$4,050,000 is placed on three years' time, dating Dec. 31, 1885, and bears interest at the rate of 5 per cent. per annum. The balance is being carried on demand and short time loans, at from 3 to 4 per cent. per annum. The claim against Kuhn, Loeb & Co., for about \$112,000, for the improper and illegal sale of this company's securities pledged with them, has been successful in two courts, and is now in the New York Court of Appeals. The attorneys of the company are confident of final success. Suit has been instituted against the St. Paul & Northern Pacific Railroad Co., Drexel, Morgan & Co., Winslow, Lanier & Co., and Drexel & Co., to recover \$2,000,000 of the stock of the St. Paul & Northern Pacific Co., believed to have been wrongfully taken from this company.

This company received \$150,000 from the Oregon Railway & Navigation Co., in settlement of a disputed claim, growing out of the sale by this company to them of the Columbia & Palous Railroad. The matter was settled by arbitration, with the above result. The claim of this company against the Northern Pacific Railroad Co. has been the subject of considerable discussion, but as yet remains unsettled.

The following is a statement of the assets and liabilities of the company, as of June 1, 1886:

Assets.		
Oregon Ry. & Nav. Co. shares	139,413	
No. Pac. pr. "	56,830	
No. Pac. com. "	79,251	
Or. & Trans. "	3,000	
Or. Imp. "	9,268	
Wis. Cent. com. "	13,514	
Mil. & Lake Winn. pr. "	2,775	
Mil. & Lake Winn. com. "	2,260	
St. Paul & N. Pac. "	4,975	
Or. Iron & Steel Co. (cost \$150,000) "	1,500	
Or. & Cal. pr. "	150	
Or. & Cal. com. "	400	
Cent. & So. Am. Tel. Co. "	1,050	
Ore. Imp. notes. "	\$518,000	
Lands, estimated value	230,000	
N. Y. City & North. first mortgage bonds	39,000	
Cost of Portland Hotel (unfinished)	15,000	
Cost of Puget Sound Shore R. R. (unencumbered)	775,000	
Cost of Cedar River Extension	335,000	
Claims against individuals	3,000,000	
Claims against corporations (unadjusted) about	112,000	
Mex. Cent. 7 per cent. bonds	25,000	
Mex. Cent. 3 per cent. bonds	25,000	
Ore. & Trans. 6 per cent. bonds	142,000	
Liabilities.		
Capital stock (400,000)	\$40,000,000	
Bills payable	\$7,717,000	
Less cash on hand	119,600	
Audited claims	7,597,400	
	26,000	

Total liabilities \$7,623,400
There are bonds outstanding of the Oregon & Transcontinental Co., amounting to \$10,063,000, against which an equal amount of first mortgage bonds of the Northern Pacific branch roads, at \$20,000 per mile, are held by the Farmer's Loan & Trust Co., trustee, which bonds, according to agreements made with the Northern Pacific Co., are practically guaranteed, principal and interest, by that company.

New York, Susquehanna & Western.

This company owns or leases and operates the following lines of railroad:

	Miles.
West End Junction, N. J., to Gravel Place, Pa.	101.30
Two Bridges, N. J., to Unionville, N. Y.	20.50
Columbia Junction, N. J., to Delaware	3.10
Paterson, N. J., to Paterson city station.	0.75
Priestville, Pa., to Winton	8.40
Total owned	134.05
Unionville, N. Y., to Middletown, leased	13.90
Lodi Junction, N. J., to Lodi, leased	1.75
Passaic Junction, N. J., to Passaic, leased	3.00
West End to Jeay City, trackage leased	2.50
Total worked	155.20

For passenger and freight business the company uses the Pennsylvania Railroad stations in Jersey City and New York. Its coal business is delivered at the Delaware, Lackawanna & Western docks at Hoboken.

The report is for the year ending Dec. 31. The Passaic Branch was not completed until after the close of the year. The equipment includes 37 locomotives; 21 passenger, 11

combination and 5 baggage, mail and express cars; 10 milk, 166 box, 2 stock, 38 lime, 117 gondola, 57 flat, 32 ore, 1,400 coal and 12 caboose cars; 1 tool car, 1 derrick car and 1 snow flanger.

The general account is as follows, condensed:

Capital stock	\$21,000,000
Funded debt	6,943,000
Car trust obligations	831,420
Accounts and balances payable	632,740
Land department liabilities	43,088
Profit and loss	7,314
Total	\$29,457,571
Road and equipment	\$20,393,494
Stocks and bonds of other companies	2,432,156
Materials and fuel on hand	20,835
Accounts and balances receivable	582,639
Cash	23,447
Total	29,457,571

The funded debt includes \$3,500,000 Midland of New Jersey 6s; \$250,000 Paterson Extension 6s; \$2,500,000 New York, Susquehanna & Western first 6s; \$600,000 debenture 6s, and \$93,000 funded coupons. By agreement, only half interest is at present paid on the debentures and the New York, Susquehanna & Western firsts.

To the car trust obligations above must be added a new trust for \$100,548 since created, making a total of \$931,968. The payment on these trusts in 1886 will be \$155,919, and in each year thereafter \$131,916.

The earnings for the year were as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Freight	\$807,189	\$739,072	D.	8.2
Passengers	234,068	230,404	D.	1.6
Mail, etc.	51,097	55,732	D.	8.3
Total	\$1,092,354	\$1,024,208	I.	5.6
Expenses	617,520	617,687	D.	107
Net earnings	\$474,834	\$406,521	I.	18.0
Gross earn. per mile	7.177	6.861	I.	4.6
Net	3.10	2.777	I.	12.3
Per cent. of exps.	56.5	59.7	D.	3.2

Renewals included 3.75 miles of new steel rails and 27,659 new ties. There was 0.75 mile new sidings built, several trestles filled in and other improvements made.

The expenses were divided as follows last year:

	Amount.	Per c.
Maintenance of way	\$93,235	8.5
motive power and cars	230,919	21.1
Transportation	223,338	20.4
Miscellaneous	39,949	3.7
Taxes	30,079	2.8
Total	\$817,520	56.5

No addition was made to property during the year. The Passaic Branch, 3 miles, was completed Feb. 1, 1886. It was built by the Passaic & New York Co., and is leased to this company at a yearly rental of \$4,200 and the taxes, the interest on the bonded debt of \$70,000 being guaranteed.

The result of the year was as follows:

Net earnings, as above	\$474,834
Interest paid	\$322,095
Rentals	25,000
Car trust payments	92,352
Balance	\$35,387

Interest paid includes only half interest on the debentures and Susquehanna firsts, as noted above. One car trust payment of \$25,200 was deferred for six months, by agreement. The rental of the Pennsylvania Railroad terminals is included in expenses.

The use of this company's tracks between Little Ferry and West End by the West Shore road was discontinued June 12, 1885, the loss in revenue resulting being about \$25,000.

During the year \$411,022 of the Midland of New Jersey securities were converted into stock and bonds of this company, leaving \$2,647,131 Midland stock and bonds still outstanding.

The report of the President, Mr. F. A. Potts, says: "The coal tonnage of your company for the past year was the largest in the history of the company, being 608,072 tons, or an average monthly tonnage of 50,672 tons, and an increase of 132,725 tons (28 per cent.) over the preceding year."

"The collieries under the control of your company, as now developed, have a producing capacity of 1,000,000 tons of coal per annum. With additional improvements and further development of the properties, the output can be increased to 1,500,000 tons per annum. The company has a transporting capacity with its present equipment of 75,000 tons a month, and just so soon as the market demand shall necessitate an increase in tonnage over this amount, provision must be made to supply the company with adequate equipment to meet its business requirements."

"In order to obtain absolutely essential rolling stock, your company was compelled to acquire the same through the medium of a car trust, and for that purpose created in November last a trust of 200 new 20-ton coal cars and 2 locomotives, with Mr. Steven V. White. The trust made runs through a period of seven years, and is liquidated by equal monthly payments of \$1,197. No payments on account of this trust accrued during the year, the first payment thereon being made Feb. 7, 1886."

"The plan adopted by your management in order to meet the interest maturing Jan. 1 and Feb. 1, 1885, from the first-mortgage and debenture bonds of the company, was pursued in respect to the interest maturing July 1 and Aug. 1, 1885, and Jan. 1 and Feb. 1, 1886, from these bonds. This plan, as was fully explained in the last annual report, provides for the payment of the interest coupons maturing from the above mentioned bonds, one-half in cash and the balance thereof in a coupon obligation, maturing in 10 years, and bearing interest at the rate of 6 per cent. per annum, which is payable annually."

"The policy pursued by your management in providing for the interest on the first-mortgage and debenture bonds in the manner mentioned, has proved most successful, the same having met with the approval of a very large portion of the bondholders."

"How soon the earnings of the company will be sufficient to fully provide for all its fixed charges, including car-trust obligations, it is perhaps difficult to say, but with the natural improvement in business now so confidently expected, which must result in increased net earnings, it cannot be very long before your company will resume payment in full on all of its obligations."

"The traffic contract of your company with the Delaware, Lackawanna & Western Railroad Co., and the trackage and terminal arrangement with the Pennsylvania Railroad Co., continue to work with entire harmony, and to the advantage and satisfaction of this company."

Atlanta & West Point.

This company operates a line from Atlanta, Ga., to West Point, 87 miles. Of this line it owns 81 miles and leases the use of 6 miles, from Atlanta to East Point. The report is for the year ending June 30.

The road is controlled by the Central Railroad & Banking

Co., of Georgia, and is operated in connection with the Western Railroad of Alabama.

The company has no funded debt. It has \$1,232,200 stock and \$1,232,200 certificates of indebtedness, which bear 6 per cent. interest, and were issued to stockholders as a dividend in 1881. The total amount of stock and certificates is \$30,425 per mile owned.

The earnings for the year were as follows:

	1885-86.	1884-85.	Inc. or Dec.	P. c.
Earnings	\$397,259	\$410,222	D.	\$12,963 3.2
Expenses	259,258	237,143	I.	22,115 9.3
Net earnings	\$138,001	\$173,079	D.	\$35,078 20.3
Gross earn. per mile	4.566	4.716	D.	150 9.3
Net	1.586	1.989	D.	403 20.3
Per cent. of exps.	65.3	57.8	I.	7.5

There was a slight decrease in earnings, due chiefly to lower rates on traffic. Expenses include taxes and all renewals and improvements of property.

The result of the year was as follows:

Net earnings, as above	\$138,001
Interest on certificates	\$73,932
Dividends on stock, 6 per cent.	73,932
Deficit for the year	\$9,863
Surplus for previous year	25,215
Surplus balance	\$16,352

President Grant's report says: "The payments of interest and dividends have been \$147,864, showing a deficit of \$9,863, which sum has been drawn from our reserve fund. "The increase of expenses over the previous year was fore-shadowed in our report last year. The necessity for new cars and the impending change of gauge, with its calls for increased material and labor, were foreseen, but we were disappointed—the receipts from through travel showing a decrease from the previous year of \$23,945. While the operations of the past year have rendered a resort to the surplus fund again necessary to pay the usual dividends, there is nothing in this fact that should be regarded as discouraging to the stockholders in view of the future. Our local business holds up fairly without apparent detriment from the extension of the Columbus & Rome Railroad to Greenville. The new competing line for New Orleans and Texas business via Birmingham and Meridian has doubtless deflected some through business from our road, but the short line has large advantages in gradients, curves and distance, which will enable it to control a large majority of the business."

"With average crops and no greater depression in the general industries of the South than at the present time, it is probable that the gross earnings will not fall far short of those of the past year."

"The only imperative want for the ensuing year beyond the current operating expenses is an increase of freight cars. The track may be maintained in its present excellent condition without further renewal of the iron rails if the finances of the company should not be easy, but the renewal of about three miles per year will doubtless be the better course if our finances will admit it."

"The change of gauge was successfully made under the carefully prepared rules and vigilant enforcement of them by the General Manager. No accident or delay occurred to mar the complete success of the change, while the cost will, we think, compare favorably, in point of economy, with any road in the system."

Ogdensburg & Lake Champlain.

This company owns a line from Ogdensburg, N. Y., east to Rouse's Point, 122 miles. The report is for the year ending March 31.

The road is controlled by the Central Vermont Co., and is operated in the interest of that company.

The equipment includes 34 locomotives; 13 passenger and 6 baggage cars; 54 refrigerator, 1,420 box, 31 stock, 233 flat and 18 caboose cars; 4 service cars.

The general account, condensed, is as follows:

Capital stock	\$3,077,000
Preferred stock	500
Funded debt	4,509,400
Trustees of the sinking fund	345
Accounts and balances	173,543
Total	\$7,760,790
Road and equipment	\$7,567,836
Bonds and other property	24,550
Materials	49,78
Cash	112,210
Balances of accounts	6,916
Total	\$7,760,790

The funded debt includes \$600,000 first-mortgage bonds; \$350,000 sinking fund bonds; \$999,750 income bonds and \$2,539,650 consolidated bonds.

The earnings for the year were as follows:

	1885-86.	1884-85.	Inc. or Dec.	P. c.
Freight	\$372,330	\$386,623	D.	\$14,293 3.7
Passengers	114,241	132,215	D.	17,974 13.6
Mail and express	17,706	16,724	I.	43 0.3
Miscellaneous	58,405	81,253	D.	22,848 28.4
Total	\$562,772	\$616,815	D.	\$54,043 8.8
Expenses	339,327	308,540	D.	59,213 14.8
Net earnings	\$223,445	\$218,275	I.	\$5,170 2.4
Gross earn. per mile	4.613	5.059	D.	443 8.8
Net	1.832	1.789	I.	43 2.4
Per cent. of exps.	60.3	64.6	D.	4.3

The decrease of freight earnings on a considerable increase in traffic shows that this road continued to suffer from the very low rates on through business.

The result of the year was as follows:

Net earnings, as above	\$223,445
Interest on bonds	\$183,822
floating debt	27,201
Balance, surplus for the year	\$12,362

This surplus will be applied on the purchase of two new freight locomotives for the road. No interest was paid on the income bonds.

The freight traffic for the year was as follows:

	1885-86.	1884-85.	Increase.	P. c.
Tons freight carried	428,598	373,184	55,384	14.8
Ton miles	38,667,291	33,400,321	5,266,970	15.5

The freight carried last year included 2,520,122 bushels of grain, a decrease of 751,658 bushels, or 23 per cent., from the preceding year.

During the year 400 tons of steel rails and 60,000 ties were built in renewals. A new iron bridge was built over the Raquette River to replace a bridge destroyed by a cyclone. Two heavy mogul locomotives were added to the equipment.

A lake line from Ogdensburg was secured by the charter of six steamers. Two of these are too small for profitable use and should be replaced by others. The report mentions that the company has an opportunity of securing by purchase three steamers formerly owned by the Wabash, St. Louis & Pacific Co., and the President believes that they would be a good investment.